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ABSTRACT

The aim of these materials is to interest students in jobs related to Alaska's natural resources. They coordinate with the Sea Week curriculum and the Alaska vocational state model curriculum in renewable natural resources in agriculture. Each of the 2-page career profiles includes a brief description of a person's job along with that person's photograph on the front page, with additional career information and suggested activities on the back page. Profiles are included for 62 occupations, ranging from subsistence jobs to professional occupations. Women and minorities are represented in the packet. (CML)

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Sea/River Week Career Profiles

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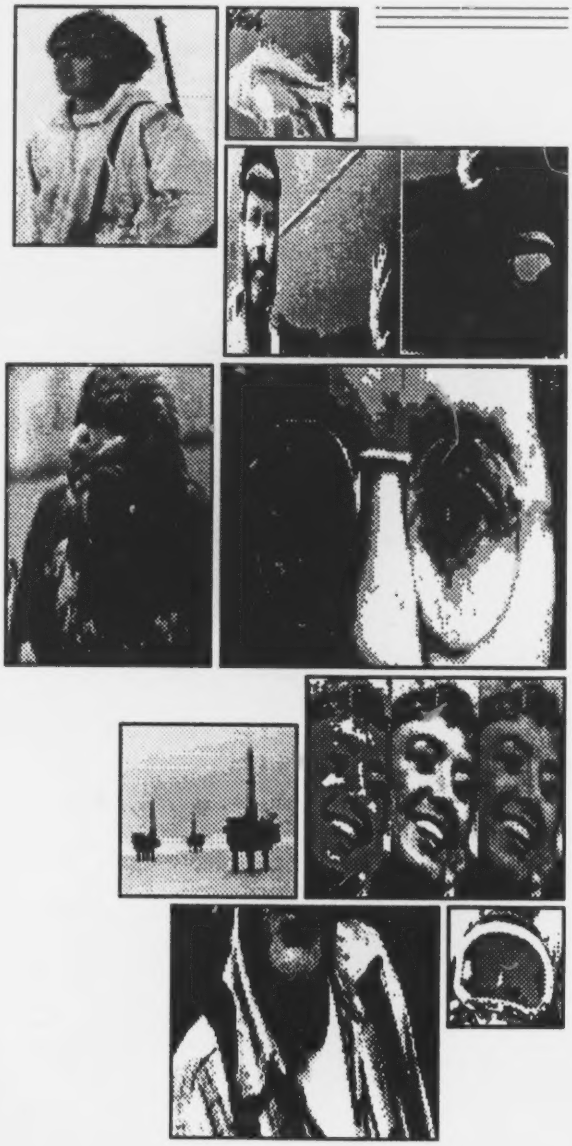

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Alaska Department of Education 1990

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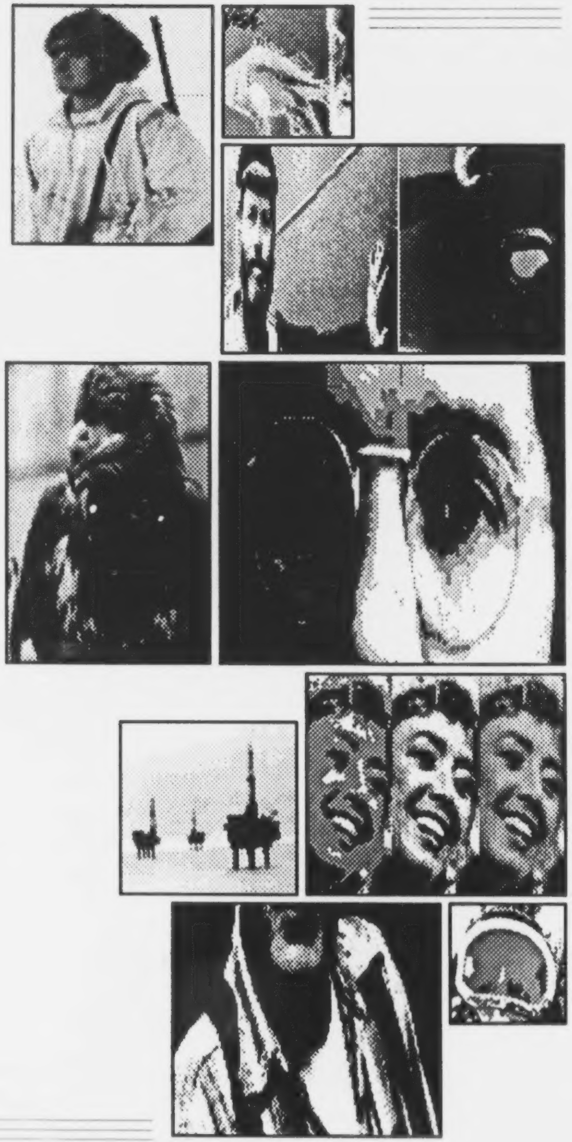
Sea/River Week Career Profiles

Alaska's natural resources industries are among the world's most valuable: Alaska's fishery industry is the single largest employer in the state and the second largest industry in terms of revenue; Alaska's oil industry operates the nation's single largest oil field; Alaska's outdoor recreation industry has a great future; natural resources is Alaska's largest employer. These **Sea/ River Week Career Profiles** accompany the heralded Sea Week curriculum as well as bridge into the Alaska vocational state model curriculum in "Renewable Natural Resources/Agriculture." The series is meant as a supplement to the Sea Week/River Week curricula to emphasize fisheries and other natural resources-related careers and opportunities. It adds vocational activities for Sea Week/River Levels I-VII. It also may be used in other classes at other levels. This project aims to interest students in jobs related to Alaska's natural resources.

Sea/River Week's thorough and exciting format and wealth of information supplies the kind of general knowledge which will provide informed workers for Alaska's sea, coasts, rivers and wetlands-related industries. These cards include examples of Alaskans working in many Sea/ River Week-related occupations. They were left unbound for a reason. Teachers should take just the cards which relate to the Sea/River Week topic or level in which they are working. Reading levels increase with the level of the card. The profiles on the front may be used for story time, for reading activities, or to initiate other student writing. The career information at the back is for either teacher or student use. The activities are suggested ones; teachers may wish to supplement them with those of their own. Each card includes a photo of the person working in that field, along with an abstract representation of that person or occupation. Teachers could photocopy the cards and cut out the abstraction and the photos for a matching game. The career information on the backs of the cards tells the kinds of background classes and other information which may lead to employment in that field as well as schools the student could attend to better prepare for that occupation. Note that several subsistence" jobs" are included.

These vocational cards are grouped by Sea Week level. Not every Sea Week/River Week unit lends itself to vocational activities. Some cards match Sea Week units; others exemplify work in other natural resources areas. Since Sea Week Curriculum Series: IV (Intertidal, Glacial and Freshwater Ecology), is still in the planning stages, cards for that level are included pending its completion. For a list of Alaskan high schools instituting marine and other renewable natural resources/agriculture programs, contact the Office of Adult and Vocational Education (OAVE), P.O. Box F, Juneau, AK 99811-0500 (465-4685). For a more thorough examination of jobs related to renewable natural resources/agriculture and non-renewable natural resources, ask OAVE for the vocational state model curricula in those areas, as well as the accompanying *Resources* publications. For copies of Alaska Sea Week contact Alaska Sea Week, CRD, Univ. of Alaska-Fairbanks, Fairbanks, AK 99701 (474-6450). These cards may also be used to supplement Alaska Wildlife Week materials, P.O. Box 20, Douglas, AK 99824 (465-4265), and Project Wild materials, ADF&G, Box 2-3000, Juneau, AK 99811 (465-4190).



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Jim Argenbright	U.S. Coast Guard Personnel
Bob Armstrong	Nature Photographers
Steve Ayers	Store Managers
Marian Beck	Ferry Boat Captains
Poppy Benson	Interpretive Naturalists
Dale Berry	U.S. Army Corps of Engineers Prsnl.
Aubrey Best	Offshore Oil Workers
Bob Burkett	Limnologists
Stan Carrick	Hydrologists
Mike Chihuly	Sportsfishing Guides
Sonja Corazza	Purse Seiners
Jerry Deppa	Animal Caretakers
Norm Dornbrier	Civil Engineers
Keith Elliot	Tug Boat Operators
John Ennor	Aquaculture Workers
Roger Evon	Subsistence Hunters
Rick Ferguson	Fish Processors
Mary Gore	Public Relations Specialists
Steve Hamilton	Bush Pilots
Judy Hauck	Museum Curators
Kim Heacox	Authors
Jon Heifetz	Biometricians
Charlie Hnilikca	Riverboat Captains
Gary Holsten	Elem. and Secondary Teachers
Ed Iten	Set Netters
Margie Karatsi	Subsistence Gillnetters
Lynn Kennedy	Taxidermists
Flo Kenney	Small Business Operators
Alex Kochkin	Market Research Consultants
Sharon Kovaleski	Seafood Shop Managers
Leif Lee	Meteorologists
Ken Leghorn	Recreation Guides
Jack Lentfer	Wildlife Biologists
Roger Lewis	Fish Leather Crafters
Peter Lind	Commercial Divers
Mike Little	Loggers
Scott Macaulay	Alaska Marine Highway Workers
Clem McCann	Ship Captains
Sandy Milner	Aquatic Entomologists
Tami Mulick	Deckhands
Darvin Nelson	Seal Hunters
Sharon Nogg	Cruise Ship Naturalists
Mike Ostasz	Environmental Health Officers
Ernie Pacheco	U.S. Coast Guard Officers
Daisy Phillips	Native Handcrafters
Jake Phillips	Longliners
Don Ronda	Vocational Marine Tech. Teachers
Kim Rudge	Fish and Wildlife Technicians
Rose Salazar	Park Rangers
Connie Sathre	Environmental Lawyers
John Sease	National Marine Fisheries Personnel
Paul Seaton	Fish Tenders
Jerry Sharrard	Shipwrights
Jim Sheridan	Wildlife Special Agents
Molly Smith	Performing Artists
Ron Smith	Big Game Guides
Walter Swearingen	Welders
Paula Terrel	Trollers
Katie Tesar	Fish Smokers
Diana Tillion	Painters
Janet Underwood	Fish and Wildlife Protection Officers
Bruce Wing	Biological Oceanographers

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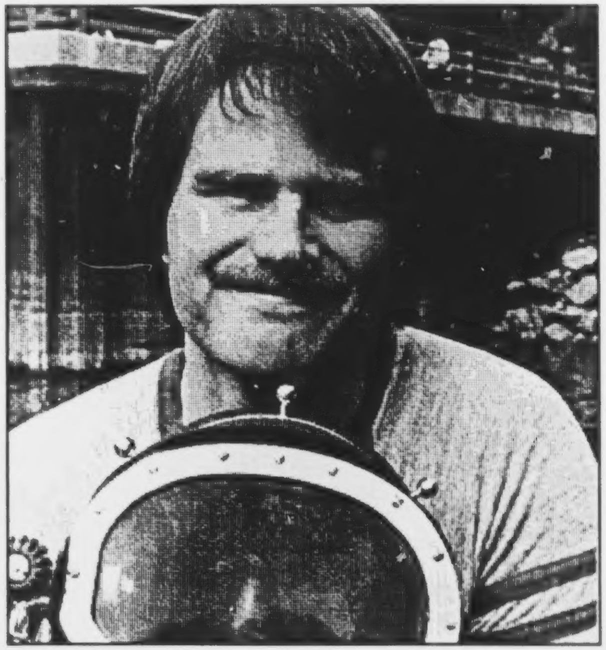
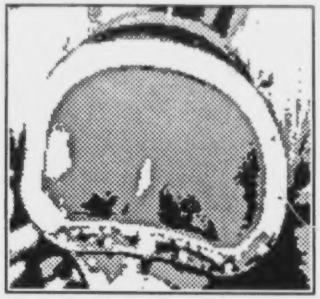
Commercial Divers



My name is Peter Lind. I'm a commercial diver. I work underwater. In Alaska the water is very cold. I wear a special suit when I dive. The special suit is called a dry suit. I even wear wool clothes under the suit! A lot of the time I work on boats. If a boat gets damaged, I may dive under it to look. If the damage is too great, the boat needs to go to a dry dock. A dry dock is where the boat is taken out of the water. Sometimes I can fix the boat underwater. Sometimes the boat has sunk and I help to bring it back to the surface. I love to dive. Underwater is a completely different world. It is very quiet unless a power boat goes by. On my job, safety is very important. Another person is always ready in case I have a problem underwater. The air that I breathe is carried along in tanks on my back. The air is under pressure. A mask on my face allows me to see underwater. Flippers on my feet help me to swim. Lead weights keep me from floating to the surface. I often see fish when I dive. When I'm under water, I sometimes feel like I'm a fish, too.

Some divers don't wear their air on their backs. Their air comes from a tube connected to a boat on the surface. Surface-supplied air allows a diver to stay underwater a little longer.

Commercial divers don't always work on boats. They may inspect docks or offshore oil rigs. Offshore oil rigs sit on platforms out in the sea. Sometimes divers build things underwater.



A lot of people dive for fun. They like to see another world. They like to look at fish. Some divers collect seafood underwater. They bring up crab and scallops that they eat with their friends and families.

Level I Discovery
Card 1

Commercial Divers, working below the surface of the water, employ SCUBA or a diving suit and diving helmet with an air line extension to the surface in order to inspect, repair, remove, and install equipment and structures. Their duties vary. Some are to inspect, repair or install equipment; guide the placement of pilings; lay or repair pipelines and cables; inspect vessels or construction projects; search for and recover sunken objects; and harvest marine life.

Opportunity for commercial divers is limited with a little over 100 employed in the state of Alaska. Divers can expect to earn $55-$75 per hour. Training is on-the-job, though divers must be certified through a national organization such as the Professional Association of Diving Instructor's (PADI) or National Association of Underwater Instructors (NAUI) training. In school students should study basic math, physics, biology, oral and written communications, health education, general shop/mechanics, and welding.

No formal program leading to a job as a commercial diver as such currently exists in the state. Related jobs include commercial fishers, Welders, Marine Mechanics and biologists.

Employers prefer those who have completed formal training in commercial diving or have equivalent training in the field. A diver's ability to perform whatever specialized work is needed for the particular project is a major consideration. Skills are learned on the job by working as a diver's helper in the Navy or Coast guard, or in diving schools. This occupation also exists in the military services.

Diver Tenders help divers into their diving suits, inspect diving equipment, and maintain communications with the submerged divers by lifeline or telephone. They hand equipment to the divers and help them into the water, and attend the lifeline and telephone to receive signals from the divers.

Activities:

1. Have the students make a SCUBA dive mask out of construction paper and rubber bands. (A template is supplied in Appendix K). On a carpeted area with cutouts of fish suspended from the ceiling by string, have them wear their mask and practice diving.

2. Invite a commercial diver to class. Have him/her bring a dry suit, dive tank, mask, and flippers and describe the equipment. Have them discuss the job of commercial diver.

3. Have students close their eyes and put their heads on the desk. Have them imagine what they see under water. Have them raise their hands when they "see" something, call on them, then have them name what they see. When they "come to the surface" have them describe what it felt like under water.

4. Cut out small ovals of white paper. That oval is the student's dive mask window. Ask students to draw what they would see through the dive mask underwater when they were diving. Did any of them draw the bottom of a boat? Did anyone draw dock pilings?

Boat Builders

My name is Jerry Sharrard. I am a shipwright in Craig, Alaska. That means I'm a carpenter for boats. I build and repair them When I first started working with wooden boats I helped an old-time boat builder. That's one of the best ways to get started as a boat builder–to learn from somebody else.

In Alaska there is steady work for boat builders and repairers. Alaska has a lot of wooden fishing vessels. Alaska's cold waters make it so the wood doesn't rot very fast. Up here wood lasts. But there's still some rot, so we fix it. Sometimes we put new wooden planks on the boat too.

I don't always work with wood. Sometimes I weld. Welding holds one piece of metal to another. Boat builders in big shipyards might spend their whole day welding. Sometimes I work with fiberglass. Fiberglass is very strong and doesn't rot, but I would rather work with wood. What I like best about being a boat builder is drawing out a picture of the boat and then making it become a real boat. Boats are useful, and I like their beauty. For boat builders, it's easy to get work, but hard to get training. Today's boats have a lot of radios and other machines. They have modern engines, so we have to know something about them. We have to know a little bit of everything in this business.

Right now I'm building a boat for myself. This boat is a long sailboat. I've just finished laying out the drawing on the floor of a big barn. One day, if you see a beautiful sailing vessel in the sunset, that might be my wife andme sailing off. How many others do work that can help to make their dreams come true?

Level I Discovery
Card 2

Shipwrights are carpenters employed in the construction of vessels. Since ship building and repair is the most broadly based category of marine careers, the education or training required for technical positions is quite varied, depending upon the particular job. Other ship-building jobs:

Electricians, working from blueprints and wiring diagrams, fabricate instrument panels, and repair and install all electrical and electronic wiring aboard ship and in the shipyard.

Fiberglass Repairmen have knowledge of both the fiberglass process and the design of hulls.

Inboard Mechanics fix, install, test, and troubleshoot engines that are built into the boat's body.

Marine Draftsmen specialize in preparing structural, machine, or electrical drawings for marine vessels or shore installations.

Riggers set the mast, tune the rigging, and know how to install all the items of sail hardware.

Ship Carpenters, using pencil, chalk, tapes, straightedges, blueprints, etc., lay out woods used in fabricating structures, cabinets, and appointments aboard ship.

Shipfitters, following blueprints and using templates and hand tools, lay out structural components for ship hulls and superstructures.

Templaters form wood or metal templates to the shape of the ship being repaired, reworked, or replaced.

Welders, skilled workers, perform welding aboard ship or in the yard.

Activities:

1. Demonstrate hand-tool selection, use and care, especially wrenches, pliers, screwdrivers, hammers, measuring and marking tools. Emphasize safe use and proper adjustment of the tools. Complete a basic repair on marine mechanical equipment such as an outboard motor (spark plug replacement, propeller shear pin replacement

2. Arrange a visit to a machine shop, service station, shipyard or plumbing shop. Have a worker explain some of the repairs completed there, especially as they relate to marine transportation.

3. Order plans for construction of a small boat. Write **Northwest School of Wooden Boat Building,** 251 Otto Street, Port Townsend, Washington 98368; **"Small Boat Journal,"** Box 400, Bennington, Vermont 05201; or obtain the book Instant Boats, by Harold Payson, International Marine Publishing Company, 21 Elm Street, Camden, Maine 04843 (207) 236-4342, 1982. As a class see what is involved in wooden shipwright work and construct a school display featuring this profession.

4. Construct a classroom display of boat models, using plastic kit models, wooden models and pictures. Make the display as realistic as possible. Assign technical interpreters to point out important vessel terms and features including stern, port, starboard, bow, transom, bilges, hatch, head, galley, bridge, garboard, keel, bowsprit, flying bridge, house, hull, mast, boom, scuppers, rudder and propeller.

Deckhands

My name is Tami Mulick. I'm a gillnetter deckhand in Cook Inlet. Deckhands are helpers on commercial fishing vessels. Our boat's called the *Ptarmigan*. My friend Jim owns the vessel. He's the skipper. Skipper is another name for captain.

We fish with *gillnets.* Gillnets are made of *filament*. Filament is like fine fishing line. The nets hang in the water from *corks.* The corks run along the top of the nets. The bottoms of the nets are weighted down with *leads* on a *leadline.* The net hangs in the water like an invisible wall. The salmon don't see the net and they swim right into it. The fish catch in the net behind their gills. That's why the nets are called gillnets. Pulling the nets in and out of the water sometimes tears holes in them, so we have extra nets handy. At the end of the summer we mend the holes.

Jim and I spend a lot of time finding the salmon. We're in a *radio group* with some other commercial fishers. A radio group is commercial fishers who help each other. *"I see three clatters of fish and they're hitting the corkline!"* I might holler into the radio when the fish hit the net. A clatter is a school of fish. We have a *scrambler* on our radio so only our radio group hears the message.

For us, safety comes first. We have survival suits, a *dingy,* a radio, plenty of flares and lots of first aid equipment. A good deckhand has to work hard and get along with the skipper. I do both.

Level I Discovery
Card 3

Gillnetter deckhands do much of the deck work aboard the gillnet vessel. They help wind the gillnets on the reel, help place the net in the water, help pick fish out of the net, and help in sorting, icing, and unloading the catch. They may assist in steering and navigating the vessel. When fishing, hours can be long. During openings the work day may start as early as 1 A.M. and continue for 24 hours or more without a sizeable break. Wages can vary with years of experience as well as skill and luck of the captain, but usually range from 10%-15% of total catch value. A $30 *[1989]* deckhand permit is required and deckhands usually supply their own raingear. The work is seasonal. Physical strength is required on this job. The job can be dangerous. Aspiring deckhands should make sure prospective vessels carry proper safety equipment and that the skipper is a safe operator. Working up to gillnet vessel captain depends on availability of gillnet permits, which, in recent years have become very expensive.

Commercial fishers use nets, hooks, pots and other devices to catch fish and marine life. Principal summer catches in Alaska are salmon and halibut. Crab constitutes the main winter catch. Fishing trips last from one day to several weeks. Boats and people can be subjected to extremely dangerous conditions. Opportunities are good in Alaska; up to 30,000 are employed during peak season. Much of the training is on-the-job.

Activities:

1. Visit a gillnetter at the docks or invite one to your class. Prepare some questions beforehand. Back in the classroom, write down what you learned. Illustrate your story with a picture of a gillnetter at work.

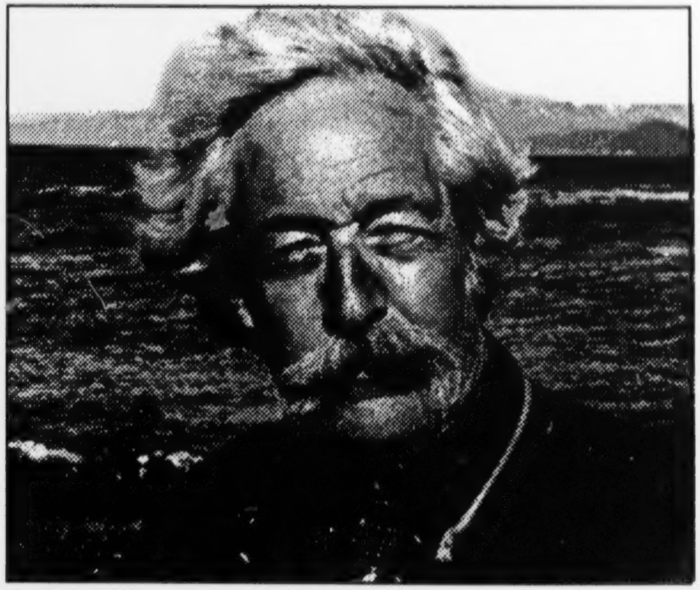
2. Obtain a piece of old gillnet and make a display in your school. Be sure to include some corkline and leadline and label them. Explain the work of a gillnetter in your display.

3. Find out what an EPIRB does and its importance to commercial fishers. (Any local commercial fishing supply store can tell you.)
If possible, bring an EPIRB to class to demonstrate its use. Discuss the importance of safety while commercial fishing. Write a paragraph about fishing safety.

4. Create some math story problems using commercial fishing motifs. Example: *If you had 3 fathoms of net how many total feet of net do you have? If you caught 235 lbs. of fish in one net, half as many in the other net and a third as many in the third net, how many total lbs. of fish did you catch*, etc.

5. Practice net repair in the class. Invite a local expert and practice. (Resources: *"Gillnet Hanging,"* Paula Cullenberg, Alaska Marine Advisory Bulletin #29, AK Marine Advisory Program, Carlton Trust Bld., #220, 2221 E. N. Lights Blvd., Anchorage, AK 99508-4143 or *"Making a Fish Net,"* Mildred Jacobsson, available from Nine Star Enterprises, Inc., 650 W. Intl. Airport Rd., Anchorage, AK 99518.

Ship Captains



My name is Captain Clem McCann. I've spent my life on the sea. I live in Seward. I'm licensed to captain ships up to *500 gross tons* on any ocean, any sea, any port in the world. I've been to Hong Kong, Singapore, Copenhagen and Marseilles. I've steamed off the coast of Africa, Borneo and Taipei. From the South Seas to the Arctic Ocean, I've been there.

Ship captains do several jobs at once. We chart *the course,* We make sure the *cargo* is safe. Sometimes we help crew members when they're lonely. Sometimes we bandage a cut hand. We do a little bit of everything because we're in charge. Captains use a lot of math. Before I set out to sea, I log a *cruise plan.* Then, everyday at sea I figure out where we are. I then see if I had made a mistake in the cruise plan. Maybe the current was different. Maybe the *ship's compass* was a little bit off. Then I fix the problem, if I can. The first thing to do to get to be a captain is to keep a log of every time you're on a power-driven boat over 14 feet in length. In school, study math and science and after school, spend a good share of time down at the docks. Keep your dream, and it'll come true.

I've had a ball being a captain. I was always seeing something new, some place different. Now I'm teaching others. I make sure they know about respect–especially with people. I make sure they respect their ship instrument readings. But there's another kind of respect. It's respect for the sea–that's important. You respect the sea–and its power. Don't ever forget that.

Level I Discovery
Card 4

Captains are responsible for the operation of the ship, and supervise the deck, engine, and steward's crews, as well as the radio operator. They set the course of the ship and maintain the ship's log. They are responsible for maintaining order, and the safety of the passengers, crew, cargo, and vessel. Although formal education is not mandatory, advancement to a captain's position on some modern and automated ships can be obtained much more easily with formal schooling at a merchant marine academy.

Opportunity in this field is good to very good in Alaska. Wages range from $2,000-$4,500 per month *[AKCIS, 1989]*. Much of the training is on the job, though preparatory training includes completion of a training program at a community college or vocational/technical trade school. College may also contribute to employment in this field. Suggested background courses include advanced math, physical science, oral and written communications, psychology, sociology, general shop/mechanics, electronics/electricity, drafting and welding. Related professions include deckhands and recreation guides.

Ship officers must have a Coast Guard license and technical skills. Ship officers need a good math background, knowledge of navigation, meteorology, cargo handling, tides, and currents. Engineers need a good math background, knowledge of propulsion systems, electricity, plumbing, metal shaping and assembly, and the ship structure. Training can come from experience at a lower-level job, community college, vocational school, or a 4-year academy.

First officers (first mates) are second-in-command to the captain. They assign duties to the crew and maintain order and discipline on board. In addition, they plan and oversee loading, unloading and storage of the ship's cargo. They also aid the captain in directing the ship in and out of ports.

Second officers (second mates) are navigation officers.. They see that the vessel is equipped with the necessary navigational charts and equipment, and that the equipment is properly maintained.

Activities:

1. Invite a licensed vessel captain to your class or visit him/her on the job. Prepare some questions beforehand. Ask him/her about their job. Write a newspaper style story about what you learned and submit it to your school or community paper.

2. Cut out pictures of ships and other vessels and make a collage for the bulletin board. Obtain pictures of as many different types of vessels as you can. Prepare (separately) a key to the types of vessels pictured, and ask other students to identify as many different types of vessels as they can.

3. Obtain a CPR card from a qualified instructor. Discuss the use and need for CPR skills on the seas and rivers.

4. Develop, using a limited budget a food list and supplies needed for 8 people for two months. Develop a menu for each week using the basic food groups. Complete grocery store price comparisons using bulk food order catalogs versus local store prices. Discuss the importance of proper nutrition at sea.

5. Make a list (with drawings) of vessel deck gear (masts & booms, tackle, winches and windlasses) and explain how each is used.

Small Business Operators

My name is Flo Kenney and I have a small business. I harvest, prepare and sell black seaweed! Black seaweed is called porphyra or *la kusk* in Tlingit. It is a traditional Indian food which is good for you!

A long time back two old Tlingit women showed me how to harvest Native foods. I decided to make a small business out of it. We harvest the black seaweed from a skiff in the open ocean. After we pick the seaweed, we dry it outdoors then grind it up and put it in plastic bags. It's delicious!

One time my nephew Jason and I were harvesting seaweed. We stopped to take a rest on a small island. Just then two deer came by and stared at us. They weren't afraid at all. This is our first year in business. I just sell to friends and at Native functions as well as trade fairs. But some day I will sell the black seaweed to the Japanese. To harvest the seaweed we had to get a permit from Fish and Game.

You know what I like most about this work? I get to be outside. I get lots of exercise. Plus, I'm my own boss, and that makes a difference! The best way to eat black seaweed is dried, with fish, with eggs or sprinkled on popcorn.

In this business you have to know the best places to find seaweed. I have some good places picked out. Would you like to know where they are? They're a secret! Having your own business is a lot of work, and a lot of fun. By harvesting and selling Native foods, I'm carrying on a tradition.

I always wanted my own business. If you believe in yourself, you can start your own business too.

BLACK SEAWEED

Level I Discovery
Card 5

Small Business Operators operate a business that sells goods, services or manufactures products. They have full responsibility for the success of the business, investing time, energy, and money into its operation. Opportunity varies in Alaska with 14,350 employed. Wages range from $1,000–$2,500 per month. Suggested training includes completion of an approved training program at a community college or vocational/technical/trade school. Suggested background courses include basic math, oral & written communications, psychology, sociology, accounting, economics, and marketing and distribution. Nearly all Alaskan postsecondary institutions have courses of study which would contribute to this field. Related occupations include financial managers, business executives and managers, and hotel and motel managers.

Operating a small business demands a broad knowledge of bookkeeping (and preferably, accounting), a technical knowledge of the service or product supplied, and willingness to work hard and long hours, and an ability to get along with people and deal with the public.

Activities:

1. Visit a small business. Prepare some questions beforehand. Be sure to ask the employees how the business got started and the kinds of services they provide. Back in the classroom, students draw a picture illustrating the experience.

2. Take students on a morning or afternoon field trip to experience a subsistence lifestyle by looking for edible wild plants, berries, etc. Prepare wild edible plants in the classroom, e.g. lamb's quarters, fiddlehead ferns, deep-fried dandelion blossoms. Resources: The Alaska State Museum, 395 Whittier St., Juneau, AK 99801, 465-2901, FAX: 465-2976 has traveling multimedia kits and publications on Aleut and Koniag use of land and plant resources. Books: **Alaska Wild Berry Guide and Cookbook**, Alaska Northwest Books, Box 3007, Bothell, WA 98041-3007; Handbook of Wild Edible Plants, Euell Gibbons and Gordon Tucker, Donning Company, Virginia Beach, 1980; Root, Stem and Leaf: Wild Vegetables of Southeast Alaska, by Glen Ray, South East Regional Resource Center, 210 Ferry Way, Ste. 200, Juneau, AK 99801; Wild Edible and Poisonous Plants of Alaska, Cooperative Extension Service, University of Alaska, 1976; and Sea Vegetables, Harvesting Guide & Cookbook, by Evelyn McConnaughey, Naturegraph Publishers, Inc., P.O. Box 1075, Happy Camp, CA 96039.

3. Students bring a local Native food to class for sampling by other students. Students should sample the foods and brainstorm ways to market that subsistence food for sale.

4. Identify different kinds of seaweeds, noting those particularly good for eating. Sample the seaweeds prepared in different ways and determine preferred methods of preparation.

Park Rangers

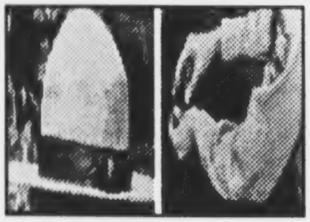
My name is Rose Salazar. I'm a park ranger. I work for Glacier Bay National Park in Southeast Alaska. National parks are large areas where wild animals live. National parks have beautiful scenery. I wear a uniform and a round hat for my job. From a distance my uniform and hat tell people who I am. Sometimes I ride cruise ships in Glacier Bay and give talks to tourists. Other times I take tourists on hikes in the forest. Still other times I show slides of birds, whales and bears. I also answer questions at an information desk. My favorite times are when I'm outside, though.

There are different kinds of park rangers. Some rangers talk to park visitors like I do. Other rangers enforce laws like police officers. Some park rangers do both. But almost all park rangers help make sure park visitors are safe. They know how to help people if they get hurt.

Sometimes I have to give talks in front of fifty people. I tell visitors about plants, animals, mountains and glaciers. I study books about those subjects so I know what I'm talking about. I photograph some of the pictures for my slide shows; others come from the park library. It takes a lot of time to put a slide show together so it tells a story.

One time when I was the ranger on a tour boat, we got very close to a rock island. People started shouting *"Look! Look! A bear is eating sea gull chicks!"* It was true. The people wanted me to do something. But in a park things are left natural, so we left the bear alone.

To be a park ranger you have to like people. You have to like giving information. And you have to like nature. I'm lucky because I like all three.



Level I Discovery
Card 6

Park rangers protect, maintain and provide for the proper use of parks and historical sites. They plan conservation, recreation and education programs. Additionally, they conduct cultural and historical tours, nature walks, and slide shows. They help visitors by providing other relevant information and assistance.

Opportunity as park rangers is limited. Alaska has about 200 employed, though seasonal work for national and state parks increases that number considerably. State park rangers can expect to earn from $2300-$3,700 per month, and federal park rangers from $1,000-$4,400 per month *[AKCIS, 1989]* plus the federal Cost of Living Allowance (COLA). Park rangers usually must go to college. Degrees in natural sciences or recreation are preferred.

Courses a student would take in school include advanced math, physical science, biology, chemistry, sociology, psychology, general shop/mechanics and physical education. Though Alaska's colleges and universities offer courses which can lead to the job of park ranger, none specifically offers a course of study specifically directed to this work. Related jobs include Foresters and Fish and Wildlife Technicians.

Entry jobs in state and federal government require a 4-year degree in park and recreation management or a related field-oriented program such as botany, archeology, or the behavioral sciences. Experience in parks and recreation or resource management is preferred. Most jobs in Alaska are seasonal.

Activities:

1. Invite a park ranger to class or visit one on the job. Prepare some questions beforehand. Have him or her discuss their job. Back in the classroom draw a picture of a park ranger at work. Give your park ranger a name.

2. Visit a local historical site or museum. Have the curator or other museum personnel tell about his or her job. If the person is a volunteer, ask him or her to tell about the job of volunteer.

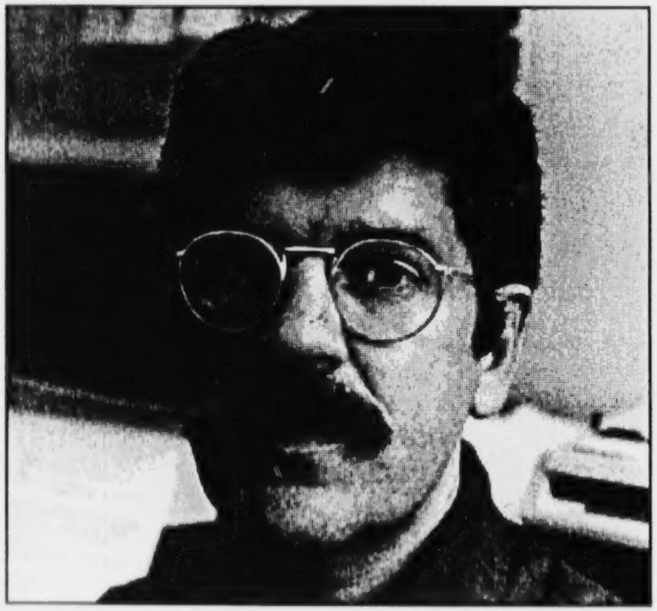
3. Visit a national state or city park. Find out who picks up the trash. Help that person by carrying along a garbage bag and putting trash in its proper place. Ask that person a few questions about his or her job.

4. Have students draw a picture of something interesting that a park ranger would see in the course of his/her job. Then, one by one students can stand and tell about what the park ranger saw in the picture. Teacher writes comments beneath each picture.

5. Make your own park ranger badge. Have the teacher print "Park Ranger" on the badge. Decorate this badge. Badges can be pinned onto students with safety pins or they can be drawn on sticky paper. Ask students to imagine that they worked in a park. Ask them the kinds of animals they would see and the things they would do. (For information contact AK Public Lands Info Ctr., 605 W. 4th Ave., Anchorage, AK 99501.)

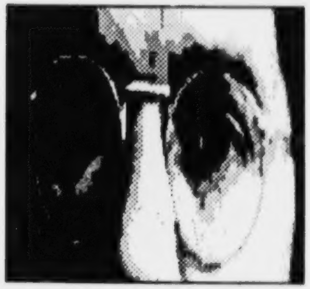
6. Take a walk with students. Allow each to be a Park Ranger by telling the "tourists," other students, about a plant, animal or tell a story along the trail.

Marine Mammal Biologists



My name is John Sease. I am a wildlife biologist. I study wild animals. I work for the National Marine Fisheries Service. The National Marine Fisheries Service helps take care of marine mammals. Marine mammals are protected, but Native hunters can take them for subsistence. Subsistence means that the hunter uses the animal to feed or clothe his family. One time I counted the number of walruses which Native hunters took. I found out if the walruses taken were young or old. I compared what I learned about walruses with what other people had learned years before. We also counted walruses from an airplane. That way we could tell how much things are changing. I love to watch animals and to learn from them. Lately we've been studying sea otters inPrince William Sound. Sometimes we study seals and other marine mammals.

Biologists write a lot of reports. We also use math–a lot of math. We also work on a computer. Even though there are a lot of reports and paperwork, our field work is very important. One time I rode on a boat in the Bering Sea and counted birds. We ran a boat along a straight line and counted how many birds we saw. Over time we could get an idea of how the birds are doing. Other biologists in my office study fish. The fish they study are pollock, cod and flatfish. They also study crab. They try to make sure there'll be fish for the future. Others in my office look over plans of those who want to build on wetlands. Even though my job deals with marine mammals the others in this office and I have a lot in common. What we like most about our jobs is our time out-of-doors.



Level I Discovery
Card 7

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

National Marine Fisheries Service (NMFS) and National Oceanic and Atmospheric Administration (NOAA) Personnel are responsible for a wide range of duties that include weather forecasting, fisheries management, charting and navigation, coastal zone management, environmental research, data gathering, and university applied research programs. The National Marine Fisheries Service (NMFS) is under the jurisdiction of NOAA. NMFS has responsibility for management of most species of marine mammals. Marine mammals found in Alaska waters are: **Dolphin** (Grampus or Risso's and Pacific white-sided); **Pacific walrus; porpoise** (Dall's and harbor); **sea otter; seal** (harbor, largha or spotted, northern elephant, northern fur, Pacific bearded or *oogruk,* ribbon and ringed); **sea lion** (Steller or northern and California); **polar bear** and **whale** (Baird's or bottle-nosed, Cuvier's or goose-beaked, fin or finback, gray humpback, killer, minke or little piked, northern right, pilot, sei, sperm and Stejneger's beaked or Bering Sea beaked). Besides marine mammal management, NMFS is also responsible for fisheries from three miles to two hundred miles offshore. This zone is known as the Exclusive Economic Zone. It is also responsible for management and enforcement of other fisheries under international agreement and habitat conservation and protection in coordination with the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game and other agencies. NMFS issues comments and recommendations to the Army Corps of Engineers for any construction projects which affect habitat. Jobs this agency offers includes marine mammal biologists, wildlife biologists, fisheries biologists, computer programmers, economists, enforcement agents, administrators and clerical workers.

Activities:

1. Invite National Marine Fisheries personnel to the classroom. If you don't live in a community where such personnel are stationed, invite state fisheries, U.S. Fish and Wildlife Service, U.S. Forest Service or other personnel. Prepare a list of questions for them before they arrive. Ask them about the kinds of animals they protect and the types of equipment they use on the job.

2. Visit an Alaska Department of Fish and Game or other management agency. Before you go, have each student get one question ready which is recorded on a clipboard. As you tour the office or field station, have that student come forward and as his or her question.

3. Cut out pictures of marine mammals and place them on the wall. Have students identify their favorite marine mammal and to say why they like that mammal. Ask students to identify some terms related to marine mammals, including dolphin, porpoise, Native, subsistence, biologist, mammal, and extinction. Write out the words on the board and use them to make a crossword puzzle.

4. Complete a survey along a line (called a transect) of familar items in your schoolyard. You might count birds, dogs, cars or other items. Run the transect daily over a two-week period. Plot the results on a simple graph with time versus number of sightings. What does the graph tell you?

Subsistence Gillnetters

My name is Margie Karasti. I am a Yupik Eskimo. I am from Ekwok. Ekwok is a village a little north of Dillingham. I fish on the Nushagak River. I fish for king, coho and chum salmon and any other fish which we catch in our gill net. I would like to get my own fishing site, and I'm saving up to buy the gear I need. But for now, I fish with my folks. For us, fishing is a family affair. To subsistence gill net we use a skiff, a kicker (an outboard motor), and anchor and of course a net. And we have a pretty good place to put the net. The net has an anchor on one end and the other end ashore. We pick the fish out of the net in the skiff. Sometimes we catch only one or two fish, sometimes fifty or sixty. It depends on the salmon run. It's really fun to catch lots of fish.

Usually the first fish we catch is king salmon. Right after we catch the fish we put canvas over them until we're ready to clean them. We clean them on a wooden table. We use our ooluks (ooluks are knives that look like scrapers) and split the king salmon into strips. We hang the fish on racks outdoors. After the fish has dried for a few days, we take it into the smokehouse. A fire smoulders in a big tub in the middle of the smokehouse. We women tend the fire in the smokehouse. We smoke the fish until it's hard. When the fish is done it's frozen in plastic bags or stored in a cache—a little house held high off the ground on legs.

When we catch dog salmon, we dry it, boil it, then eat it with *a-goot-tuq*–Eskimo ice cream. I love fishing in the village. I love being outside. We have a good time together. Catching fish brings everybody closer together. I feel privileged. Some people would pay a lot of money to catch just one fish. We catch a lot of them.

Level I Discovery
Card 8

Subsistence Gillnetters catch fish for personal use. Subsistence is a controversial issue. Though it is a difficult concept to define, Federal law states that subsistence defined "the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter or sharing for personal or family consumption."

The state of Alaska has established subsistence use of fish and game as the highest priority consumptive use of the resources.

Subsistence fishing regulations are available as a pamphlet from the Alaska Department of Fish and Game, P.O. Box 3-2000, Juneau, AK 99802. Subsistence fisheries include fish wheels, set nets, drift nets, dip nets, and pole and line. Some subsistence fishing operations use gear similar to the commercial fisher. Set gill nets are usually 25 fathoms (150 feet) long or shorter. They are anchored at both ends, usually to a tree or post on the bank and to an anchor in the river.

Most nets in use today are machine made of synthetic fibers, but modern nets do get damaged and have to be repaired by hand. Net mending is somewhat complicated, and you would need to learn it from another fisherperson. (A booklet Net Mending and Patching, by Paula Cullenberg is available from Cooperative Extension Service.) Work with another successful fisherperson or consult the Alaska Sea Grant Advisory Program U of AK-Fbks, Fairbanks, AK 99701

Activities:

1. Invite a subsistence fisher to your class. Ask him/her to bring some of their fishing equipment along to explain how they catch fish.

2. Smoke some fish as a class project. (Warning: if smoked fish is improperly prepared, it can be dangerous. See your extension agent for instructions on proper fish smoking).

3. Invite a fish and wildlife protection officer to class to explain rules and regulations related to subsistence fisheries. Ask him/her about subsistence fisheries in your local area.

4. Visit a Native elder or ask him/her to your classroom. Respectfully ask him/her about how subsistence fishing has changed over the years. Prepare some questions for the elder before the visit.

5. Create a poster depicting a method of subsistence fishing in your area. Display the poster in the hall in your school.

6. Make a chart comparing the nutritional composition of subsistence-caught fish with store-bought foods. Compare the results. Then obtain some subsistence-smoked fish and taste it. Compare its taste with canned tuna or other store-bought fish. (Warning: if smoked fish is improperly prepared, it can be dangerous. See your extension agent for instructions on proper fish smoking).

7. Complete a seashore survival activity. Relate the factors of food, water, shelter, heat, cold and time on the affected person. Discuss the following: What is hypothermia? Why is water most important? What are the first things to do to survive? How can you conserve energy? Are attitude and the will to survive important? Role play a survival situation with five basic articles of equipment or five natural resources at hand. Identify ways that each could be used.

Taxidermists

NINILCHIK
FISH MOUNTS

My name is Lynn Kennedy. I'm a taxidermist. Taxidermists prepare fish and wildlife for display. You've seen a big fish above a fireplace or a moose head on somebody's wall. Taxidermists create those *mounts.* I live on the way to Homer on the Kenai Peninsula. Sports fishermen catch huge king salmon in salt water and in rivers. I specialize in king salmon. I've mounted four of the five record sport-caught king salmon in the world. In my shop we take real pride in our work. Taxidermy is an art.

To mount salmon we make a paper pattern and measure the fish. Then we separate the skin from the meat. We give the meat back to the customer. All our mounts are made from the real fish skin. Using our measurements, we carve a styrofoam mold in the position we want the fish to pose in. Our knifes have to really be sharp to shape styrofoam. The fish skin is then stretched over the mold and sewed in the back. We make the fins look like real life. Then, the skin is hung to dry–for a whole year! Drying the fish's natural oils takes a long time. We patch holes and repair fins with epoxy. A realistic eye, mouth, and tongue are placed on the fish. When the fish skin dries, it loses its colors, so we paint the skin. When completed, the fish looks freshly caught. Wow! A beautiful display!

NINILCHIK
FISH MOUNTS

The best part about taxidermy is the customers. One lady was fishing for *dolly varden* and hooked into a king salmon. Well, that salmon fought and fought and then jumped, kerplunk! right into somebody else's boat! Luckily that guy gave her the fish. We mounted that salmon. Just think of all the stories being told about catching trophy fish. Taxidermists help turn *fish stories* into fish reality!

Level I Discovery
Card 9

Taxidermists are often independent business persons. They render artistic recreations of fish and wildlife trophies for homes, museums and offices. They usually work with the original trophy, though they may create facsimiles of the trophy from plastic or vinyl. They work with plastic for certain effects and work with glass for others. An artistic flair and a liking for people are important in this business. Some painting is involved as well as some woodwork and other means of making forms, frames and molds. Established taxidermists build up a clientele over time. They can work out of their home or a shop. A successful taxidermist can have year-round work in Alaska, as trophies can take up to a year from receipt of the carcass to final shipping to the client. Assisting with preparation and proper dispensation of wild game meat may be part of the job.

Training is on-the-job, though some training programs do exist. Alaska is considered prime country for taxidermy, because of the abundance of game and trophy animals. Prices vary according to animal and the ability of the taxidermist, as well as the pose and mount. A large king salmon can gross over $500. Taxidermists are licensed by the state of Alaska.

Painters use a variety of colors, different paints and textures to create an impression. Painting skills are easily transferable to taxidermy so that natural tones and colors are preserved. Painters often use maritime settings in their work. Marine scenes have always attracted artists and viewers alike. Painters frequently inhabit seaside villages and communities. Frame-making skills are easily transferable to making and finishing mounts for fish and wildlife trophies.

Sculpting skills are useful to the taxidermist, especially in forming the mold and in placing the fish or other game in an attractive pose. Sculptors often specialize in creating works that represent different forms of marine or other wildlife. The carpentry skills of a sculptor are also useful in making frames and mounts for the trophies.

Activities:

1. Visit a local taxidermist or invite a taxidermist to the class. Prepare some questions beforehand. After the visit, write and illustrate a paragraph about the job of taxidermist.

2. Complete paper maché models of trophy fish and game. Paint your specimens and place them in a *"Hall of Fame"* of big game trophies. (You can add teddy bears and other stuffed animals to the collection). Locate the display prominently in the classroom. Give younger students a tour of the exhibit, with the tour guide describing the work of taxidermist as well as the fishing or hunting story that goes with the trophy (ham it up!)

3. Prepare a taxidermy specimen in the classroom. How-to books are available in the library and at bookstores. Display your trophy.

4. Phone some local taxidermists and compare prices. Complete a math lesson using taxidermy prices per inch (or centimeter) for various trophies.

Subsistence Hunters

My name is Roger Evon. I am a Yup'ik Eskimo. I hunt fox, ptarmigan, seal, beaver, sometimes wolverine. I hunt with a .22, a 30.06 and a shotgun. With a bigger rifle I hunt moose, caribou and sometimes beluga whale. When I go hunting I'm always prepared. I always have a full tank of gas in the Sno-Go. I always carry matches, a flashlight and tools–just in case. I always tell someone where I'm going.

My favorite food is ptarmigan. But they're hard to shoot. They sleep under the trees, so I never know where they are. Then they come fluttering out all at once and scare me. I use a rifle for beluga whale, but I also need a harpoon. The harpoon is tied to a float. When I shoot the whale it dives, but the float keeps it from going too deep, and it tells me where it is. It takes four of us to pull the dead whale up on the beach. Then when the tide goes out, we cut it up. When we kill a seal we use practically everything. We cook the meat. We put the blubber in jars until it settles, then we scoop the seal oil off the top. Seal oil is so good with meat! We use the skins to make clothes like hats or *mukluks*–Eskimo boots. I bring meat to my parents, to my sisters' kids, to my neighbors and to old people. It's good luck to give meat to old people.

Level II Animals of the Seas and Wetlands
Card 1

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Subsistence hunters provide food for numerous Alaskan families. Though it is a difficult concept to define, federal law states that subsistence is "the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter or sharing for personal or family consumption."

The state of Alaska has established subsistence use of fish and game as the highest priority consumptive use of the resources. Alaska's legislature passed subsistence priority laws in 1978 and 1986. The U.S. Congress passed a priority subsistence law in 1980 for federal lands in Alaska. According to Alaska state subsistence statutes passed in 1986, only rural residents can be considered subsistence users. In addition to the rural requirement, subsistence uses can be identified by a variety of other criteria, such as long-term traditional use, local area use and frequent sharing of game resources, and is not authorized if harvesting will damage the resources.

Subsistence hunting regulations are included with the annually-published state hunting regulations, available from the Alaska Department of Fish and Game, P.O. Box 3-2000, Juneau, AK 99802. Licenses, metal locking tags, harvest reports and tickets may be obtained from any designated issuing agent or by mail from the Department of Revenue, Fish and Game Licensing Section, 1111 W. 8th Street, Room 108, Juneau, AK 99801 Phone (907) 465-2376.

Activities:

1. Bring a guest speaker to class to discuss the subsistence lifestyle. Ask him or her to bring in some of the tools they use as part of their livelihood and to bring in a sample of the subsistence foods (or clothing) they produce. Compare the cost and nutritive value of store-bought foods to subsistence foods.

2. Identify the equipment used in seal and walrus hunting, including types of rifles used, harpoon(s), tow lines, types of boats etc. Draw a picture showing a hunter taking walrus or seal. Post your picture in the school.

3. Make a beaver hide scraper with a moose foreleg bone. (Ask a Native elder for instructions.) Prepare a beaver or other hide in class for tanning. Then, tan the hide and display it.

4. Build a survival shelter using spruce boughs, driftwood, rocks, etc. Build and set a rabbit snare. If you catch a rabbit, clean and prepare the rabbit as survival food. Resources: Fieldbook, Boy Scouts of America; Basic Hunter's Guide, National Rifle Assoc., P.O. Box 96031, Washington, DC 20090-6031; Wilderness Survival Guide, Alaska Northwest Books, Box 3007, Bothell, WA 98041-3007.

5. Learn how to set traps and maintain a trapline. Invite a trapper to class. Resources: Self-Sufficiency Resources, Alaska Dept. of Education, OAVE, P.O. Box F, Juneau, AK 99811. *'Yukon-Kuskokwim Delta Tundra and Flatland Trapping for the Entry-Level Trapper,"* Nunam Kitlutsisti, P.O. Box 2068, Bethel, AK 99559.

6. Write for the elementary-level picture book *"Our Daily Bread,"* concerning seals, *the lifebood of Inuit subsistence livelihood*, from Dept. of Renewable Resources, Field Svc. Div., P.O. Box 1320, Yellowknife, NWT, X1A 2L9 Canada. Use the pamphlet for a classroom reading exercise.

Alaska Marine Highway Workers

My name is Scott Macaulay. I'm a relief chief mate on the Alaska Marine Highway. The Alaska Marine Highway is the state ferry system. We take passengers, cars and trucks between places in Southeast and Southwest Alaska. In the summer lots of tourists see Alaska from the ferries.

After high school I went to a maritime college. I got my degree there. I logged my sea time and took the exam for third mate's license–the test was three days long! I've worked my way up from there.

In rank the chief mate is just below the captain. My chief duty is the vessel's safety, condition and how neat it is. But when there's fog or rough seas, I help the captain. When we're at sea we never know what we're going to see. Once when I was a second mate I was on the bridge. We were in Queen Charlotte Sound. Suddenly a minke whale jumped in front of us. The whale then dove and I didn't see it for a long while. Just then it jumped up again right alongside the boat. For a moment that whale and I were almost eye to eye! What a show!

When we load and unload cars and trucks, I'm the boss of that. We make sure we're always careful. When you're moving people and goods on the sea you have to be careful. The safety and comfort of the passengers and the safety of the vessel always come first.

Level II Animals of the Seas and Wetlands

Card 2

Ship officers oversee the general welfare of the crew and vessel. They supervise the loading and unloading of cargo, cleaning and maintenance of the deck and hull, running and navigating the ship, and communications and logs. Marine engineers supervise the operation and repair of engines and other equipment. Pursers assist passengers, do payrolls, and process the paperwork necessary to enter and leave ports. Employment opportunity in this field is good to very good in Alaska with 140 employed. Wages range from $2,000-$4,500 per month *[AKCIS, 1989].* Much of the training is on the job, though preparatory training includes completion of an approved training program at a community college or vocational/technical trade school. College may also contribute to employment in this field. Suggested background courses include advanced math, physical science, oral and written communications, psychology, sociology, general shop/mechanics, electronics/electricity, drafting and welding. Related professions include deckhands and recreation guides.

Ship officers must have a Coast Guard license and technical skills. Ship officers need a good math background, knowledge of navigation, meteorology, cargo handling, tides, and currents. Engineers need a good math background, knowledge of propulsion systems, electricity, plumbing, metal shaping and assembly, and the ship structure. Training can come from experience at a lower-level job, community college, vocational school, or a 4-year academy.

First officers (first mates) are second-in-command to the captain. They assign duties to the crew and maintain order and discipline on board. In addition, they plan and oversee loading, unloading and storage of the ship's cargo. They also aid the captain in directing the ship in and out of ports.

Activities:

1. Visit an office of the Alaska Marine Highway system and interview the worker(s) there. Or, ask a ferry worker to come into the classroom. Prepare some questions beforehand.

2. Obtain a copy of the Alaska Marine Highway schedule (P.O. Box R, Juneau, AK 99811; phone: 907-465-3946) and have each student plan a ferry trip between two Alaskan points for their family or friends. They need to figure the departure and and to calculate the cost for the vehicle and passengers for this trip.

3. In groups in the classroom construct plastic ship models of different types of ships. Paint one vessel to look like an Alaska ferry. This activity can take place over time. Prepare a display and give other classes a tour, explaining the different vessels.

4. Ask the local health aide or an EMT or other qualified person to conduct the basic 8-hour Red Cross First Aid course. The aide or EMT volunteer teachers and the classroom teacher completes follow up and review. Students take the exam for their first aid cards. Discuss the need for first aid skills on the seas and rivers.

Ferry Boat Captains

My name is Marian Beck. I live in Halibut Cove, Alaska, on Kachemak Bay. I'm captain of the *Danny J*, a little ferry boat. We take people between Homer and Halibut Cove. We carry passengers and the mail. The Danny J. was built in 1949. She's made of wood. Her woodwork inside is so shiny and beautiful! The Danny J makes me feel like it's the olden days. We only use the Danny J in summer. In winter, we have a bigger ferry boat made out of steel.

The Danny J holds 34 paying passengers, one crew member and myself. That makes 36. In summers we cross Kachemak Bay to Homer every morning. Then we let our passengers off and pick up other people. We leave Homer at noon and circle Gull Island on the way back to Halibut Cove. The tourists really love to get a good look at the gulls, puffins, cormorants, murres and pigeon guillemots on Gull Island. The birds peep and squeak, diving off the rocks into the sea all around the boat. What a show! One time in Kachemak Bay tall black fins rose out of the water alongside the Danny J. *What's that?* I wondered, glancing quickly from one side to the other. Just then two bursts of air came from black and white shapes. We were in the middle of a pod of orcas. They were all around us!

The Danny J's crew is all women. We have to be physically fit and mentally sharp. This job is perfect for a woman. Don't you agree?

Level II Animals of the Seas and Wetlands

Card 3

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Captains are responsible for the operation of the ship, and supervise the deck, engine, and steward's crews, as well as the radio operator. They set the course of the ship and maintain the ship's log. They are responsible for maintaining order, and the safety of the passengers, crew, cargo, and vessel. Although formal education is not mandatory, advancement to a captain's position on some modern and automated ships can be obtained much more easily with formal schooling at a merchant marine academy.

Opportunity in this field is good to very good in Alaska with 140 employed. Wages range from $2,000-$4,500 per month *[AKCIS, 1989]*. Much of the training is on the job, though preparatory training includes completion of an approved training program at a community college or vocational/technical trade school. College may also contribute to employment in this field. Suggested background courses include advanced math, physical science, oral and written communications, psychology, sociology, general shop/mechanics, electronics/electricity, drafting and welding. Related professions include deckhands and recreation guides.

Captains must have a Coast Guard license and technical skills. They need a good math background, knowledge of navigation, meteorology, cargo handling, tides, and currents. Engineers need a good math background, knowledge of propulsion systems, electricity, plumbing, metal shaping and assembly, and the ship structure. Training can come from experience at a lower-level job, community college, vocational school, or a 4-year academy.

Activities:

1. Invite a vessel captain (a passenger vessel captain if you can) to the classroom or visit him/her on the job. Prepare some questions beforehand. Back in the classroom write and illustrate a paragraph about the life of a boat captain.

2. Make a boat model as a class project. Plastic models are available at any hobby shop. Put the boat together one part a day, and write the name of the boat part on the board. That boat part can be your word of the day.

3. Visit a museum. Count the number of boats you see there along with a brief description of the boat. Back at the classroom make a list on the board of the vessels you saw. How many did you count? Students can draw pictures of the boats they remembered.

4. Duplicate basic outlines of a fishing and/or other vessels on white paper, duplicate pages from coloring books, or have students draw their own boat outlines. Students then add a captain, passengers and a vessel name. Display the pictures when completed.

5. Bring in a skiff or other old boat into the school as a decoration. Install an outboard motor on the skiff (or facsimile). If possible, suspend the skiff from the ceiling. Students can be seated by groups in the skiff for story time, or they can make-believe some work activities the skiff may be used for. Later, students can write or tell about those activities. If no skiff or other small boat is available, mark out the outlines of a boat on the floor and make "gunwales" of taped cardboard. Treat this area of the classroom as a skiff. Make it as realistic as possible. Students can use the "skiff" for reading activities related to Sea/River Week.

Fish and Wildlife Protection Officers

My name is Janet Underwood. In the summers I work for the Alaska Department of Public Safety, Fish and Wildlife Protection Division. I help to protect Alaska's fish and game. Sometimes I drive a boat. Last summer I walked along a river in Haines. I asked people to show me their fishing licenses. If they were fishing without a license, I wrote them a ticket. When they got a ticket, they had to pay some money. Nobody likes getting a ticket. But if everybody caught fish without a license, the fish might go away. Money for fishing licenses is used to study fish. Some of the money is used to protect streams, where fish live. When I write a ticket I always explain that fishing licenses help Alaska make sure there are plenty of fish to go around.

Sometimes I help the bears. I make sure that hunters have a license and that bears they bring in are properly tagged. I do the same thing with deer. Sometimes I have to be by myself for a long time. I really like those times. That's when I especially notice the forest–and the seashore. I love the fresh air, even if I do get wet when it rains. I also love to camp out.

Sometimes when I visit some fishermen or hunters I feel sad. I'm not sad because they are hunting or fishing; that's natural. I'm sad because they are afraid I will give them a ticket. They don't need to be afraid. If they have licenses and obey the law, nothing will happen. They can be glad that somebody is protecting the animals.

Level II Animals of the Seas and Wetlands

Card 4

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Fish and Wildlife Protection Officers enforce laws and regulations designed to protect and conserve fish and wildlife. They warn, cite or arrest individuals suspected of violations. They may seize the fish, game and equipment connected with the violation. Additionally, they collect information on the condition and numbers of fish and wildlife in the area in which they patrol. Patrolling by boat, plane or on foot, they enforce state boating laws, search for and rescue boating accident victims, and conduct marine safety education.

Opportunity in this field is limited with 170 employed in Alaska. Wages range from $2,100-$3,800 per month *[AKCIS, 1989]*. Suggested training includes an associate degree or college.

Suggested background courses include basic math, biology, oral and written communications, psychology, sociology, general shop/mechanics, and physical education. Alaska training sites include Sheldon Jackson College, U of AK-Anchorage, U of AK-Fairbanks and U of AK-Southeast.

Related occupations include park rangers and fish and wildlife technicians.

To compete for state and federal jobs, applicants must have some experience in law enforcement or a college education and be on the appropriate registers. All people currently being hired have several years of law enforcement experience. An associate or bachelor's degree in biology, wildlife or conservation is helpful. Candidates should meet strict physical requirements andpass a background check for fitness of character.

Activities:

1. Invite a Fish and Wildlife Protection Officer to class. Have the students ask him/her about his/her job. Emphasize that anyone can be a Fish and Wildlife Protection Officer with the proper training and background. Ask how the officer checks permits. Ask the officer to explain fish tickets. Ask the Alaska Department of Public Safety, Division of Fish and Wildlife Protection about their "Information and Education" and "Safeguard" programs.

2. Have one student make and wear a Fish and Wildlife Protection officer "badge". Have that student do a "patrol" of the classroom, checking for fishing licenses (students make their own). If someone doesn't have their fishing license, have the Fish and Wildlife Protection Officer issue a ticket. (again, which the student designs). Have them explain that fishing licenses allow the ADF&G to be able to tell how many fish there are in relation to how many fish are being caught. This activity can also be performed on a Sea Week/River Week outing. The Fish and Game Protection Officer will also watch for littering, shell collecting or other offenses during a hike. The officer can ask the offender to please correct the offense. After a set period of time, switch off and another student can act as Fish and Game Protection Officer.

3. Have students identify the ways that Fish and Wildlife Protection Officers travel. They might name patrol car, snow machine, power boat, canoe, aircraft, or four wheelers. They also get around on foot. Students can also identify what a Fish and Wildlife Protection officer has to take along when he/she goes out camping.

4. Have students complete a mural about one of the activities of the fish and wildlife protection officer, for example, a patrol officer fining/catching someone in violation of fish and game laws.

5. Students can draw a picture of a Fish and Wildlife Protection officer. Tell a story about what he/she does. Give him/her a name.

Native Handcrafters

My name is Daisy Phillips. I am 70 years old and have 13 grandchildren. I am Chilkat Tlingit, from Haines, though originally from Klukwan. I love to make earrings, baskets and moccasins.

When I was born they wrapped me up in a *papoose*. Then our village was much more traditional. I remember using goat horn spoons at home. We even made our own canoes at that time. I started making handicrafts when I was nine. I learned how to make things from my mother and grandmother. She learned from her mother and grandmother who learned from her mother and grandmother. I helped my grandmother make button blankets. "Never gossip," she would say, "and never exaggerate–and go wash your face, you look dirty!" I always listened to my grandmother.

Sometimes I make handcrafts for relatives. Other times I make handcrafts for our Tlingit dancers. And sometimes I make handcrafts for sale. Some of my sealskin vests sell for $500! I used to have a Native crafts shop in Haines, and I'm thinking about opening up again.

For earrings, I use porcupine quills. For vests, and hats, I use felt, beads and buttons. For moccasins and high boots I use moose hide and *sinew* for thread. Sinew comes from near the bone. It is very strong. Before I sew beads on moccasins or vests, I draw the design on paper. All Tlingits are either in eagle or raven clans. I am eagle clan. Our clan's designs are eagle, bear head and killer whale. Our colors are blue, red, brown and black.

I'm always working on something. When I was little my mother told me "Always keep your beads wrapped in a towel." I still do that. In fact I'm making a vest right now. Would you like to see it?

Level II Animals of the Seas and Wetlands

Card 5

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Handcrafters create and manually make a wide range of artistic and practical items for sale. In Alaska, this may include traditional crafts as wood, ivory, and soapstone carving, basketry, and leather work. Other items handcrafters create include pottery, weaving, jewelry, and woodworking. Handcrafters also perform tasks including selling the items and doing minor bookkeeping.

Opportunity varies in Alaska with 2,500 employed. Wages vary greatly. Good background courses for this profession include basic math, physical science, oral and written communications, history, art, sewing and graphic communications. No Alaska postsecondary school has a program leading specifically to work in this field. Related professions include small business operators and jewelers. Most handcrafters are self-employed. Many handcrafts are sold to tourists. Success in selling is therefore tied to changes in that industry. Tourism is expected to do well in the near future.

Store salespeople display and sell merchandise in retail and wholesale stores. They provide general information about the product and assist and advise the customer. They prepare sales slips or contracts. They receive payment or credit card. In small stores they may do the ordering, pricing, display work and inventory.

Opportunity is very good in Alaska with 6,860 employed at a wage of $800-$1,500/month *[AKCIS, 1989]*. A high school diploma or GED is required. Training is on-the-job. Good suggested background courses include basic math, physical science, oral and written communications, psychology, home economics and marketing and distribution. There are no Alaska training sites specifically targeting this profession. Related occupations include sales representatives.

Activities:

1. Invite a Native elder to class to discuss the Native culture in your area. Prepare some questions beforehand. Be sure to ask him or her about historic Native handcrafts in your area. Make a simple coin purse out of leather or cloth and decorate it with local Native designs.

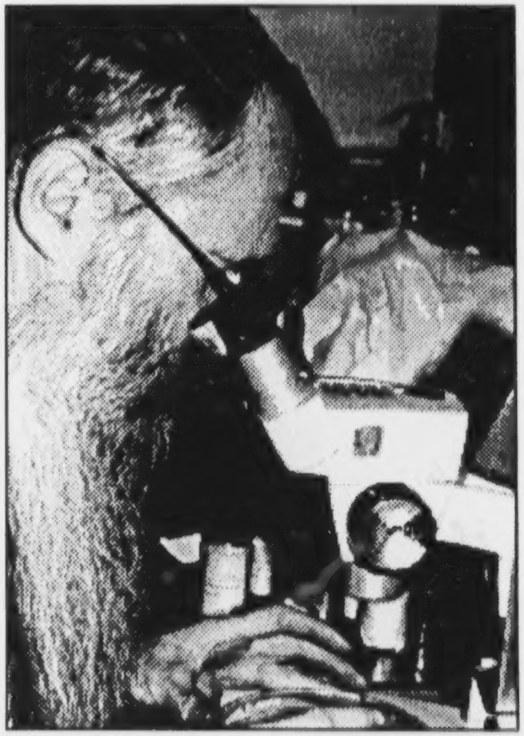
2. Collect driftwood and other items from the beach (including human-introduced) and make a mobile or 2-D collage on a board. Paint with polyurethane to preserve and secure, or collect beach grass and weave simple baskets and/or rope for hanging planters. Market the baskets at a school function if you like, or make jewelry with shells, rocks and driftwood.

3. Sew skins into masks, parkas, mukluks, etc. (Resources: *"The Cloth Parka,"* and *"Fur Parka,"* Cooperative Extension Svc., U of AK; *'Skin Sewing for Clothing in Akula,"* Alaska Historical Commission No. 22, Office of History and Archaeology, P.O. Box 107001, Anchorage, AK 99510-7001; Alaska Native Arts and Crafts, AK Geographic Soc., 137 E. Seventh Ave., Anchorage, AK 99501.)

4. Invite someone from a local craft or gift shop to the class or visit a shop as a class to discuss the potential for marketing handcrafts. In rural areas contact Alaska Native Arts and Crafts Assoc., 333 W. Fourth Ave., Anchorage, AK 99501.

Biological Oceanographers

My name is Bruce Wing. I'm a biological oceanographer. Biological oceanographers are scientists who study the plants and animals of the ocean. I work for the Auke Bay Lab. Currently I'm studying sablefish and rockfish. These are groundfish–fish that live deep in the ocean. I make reports to the North Pacific Management Council. They decide how many fish commercial fishers can catch. That way there will be plenty of fish in the future.



On another project I studied humpback whales. We tried to decide if cruise ships were disturbing whales in Glacier Bay. Some people said the whales were leaving the bay because ship propellors made noise underwater.

I'm also responsible for our museum collection here at the lab. We have many kinds of worms, snails, octopus or other sea creatures–all of them pickled in jars. It's sad to see animals pickled, but our museum helps scientists identify invertebrates of the ocean.

Oceanographers are trained in all the sciences–biology, physics and chemistry. We use pictures of the sea taken from satellites. We collect zooplankton with nets. Sometimes we use submarines. Submarines are boats which go deep underwater.

Sometimes I like to just think about science. Plants need sunlight to live; everyone knows that. When I was in college, I started thinking that some plants deep in the ocean could live without light. Not long ago another oceanographer in a special submarine dove deep in the ocean and discovered the kinds of plants I imagined.

Level II Animals of the Seas and Wetlands
Card 6

Oceanographers study the movements, physical properties, and plant and animal life of oceans. They may study and collect data on ocean tides, currents and other phenomena. They also may study undersea mountain ranges and valleys, oceanic interaction with the atmosphere, and layers of sediment on and beneath the ocean floor.

Opportunity in this field is limited with about 20 oceanographers employed in the state of Alaska. Wages range from $1,700-$3,700 per month *[AKCIS, 1989]*. College and graduate studies are required for this profession; in many cases a PhD is required.

Courses leading to work as an oceanographer include advanced math, biology, chemistry, physics, oral and written communications, sociology, geology and computer applications. UAF has a program in oceanography.

Related professions include biologists, geologists, meteorologists, physical scientists, plant scientists, mathematicians and statisticians, university and college teachers and commercial divers.

The minimum requirement for beginning jobs is a bachelor's degree; however, most jobs require graduate training and many high-level positions require or prefer a doctoral degree.

Biological oceanographers (aquatic biologists) study marine plant and animal life and seek knowledge of the environmental factors affecting them.

Oceanographic technicians assist oceanographers in a variety of chemical and physical tests and analyses, such as tide and current studies, water analysis for dissolved gases and minerals, and wave studies.

Activities:

1. Complete a quadrant species count (census). Identify types of species and numbers in a square meter. Are they migratory? Seasonal? Complete three different quadrant censuses along a transect (e.g., upper tide level to lowest tide level) and compare. Use a field guide for identification of starfish, mollusks, etc. Identify how such information would assist an oceanographer in his/her studies.

2. Yellow-dye water. Add methyl blue and stir in clockwise motion. Have students observe what happens to the blue color. Explain that the sea has rivers (currents) such as the Humboldt Current, Japanese Current or Gulf Stream and that currents mix the water in the ocean. For a variation, mix salt water and fresh water (each dyed differently). Discuss why an oceanographer would study the currents in the ocean.

3. Cover the bottom of an aquarium with sand and add water. With a paddle, generate waves that will affect the movement of the bottom, creating a model for tidal mechanics and erosion. Discuss why an oceanographer would analyze beach erosion.

4. Set a sampling plankton net and census the specimens caught, illustrating, graphing and identifying what you find. Explain why an oceanographer would make such a census.

5. Invite an oceanographer to your class, visit a laboratory or correspond with an oceanographer. Ask students to explain why the job of oceanographer is important.

6. Identify rockfish and sablefish using a field guide or key. Find out where they are found and how commercial fishers catch them. Make a display in your school featuring these fish. Draw a picture of these fish or of an oceanographer studying them.

Fish Smokers

My name is Katie Tesar. In the summer I work at *Taku Smokeries.* We process fish. To process fish we clean it and freeze it. Or, we smoke it. To smoke fish, we slowly burn alder chips. The alder smoke cures the fish. The fish tastes really good when it's smoked. After we smoke the fish, we vacuum pack it. To vacuum pack, we wrap it in plastic and take all the air out. That way the fish will last longer. Our fish smoking machine is computerized. That means we can *program* the machine to cook the fish the right length of time.

If you caught a king salmon, you might bring it to us to process. If you were in an airport, you might see some of our fish jerky for sale. If you shopped, you might find some of our smoked fish in grocery stores. And if you rode on a cruise ship, you might find some of our halibut on your dinner plate! We sell a lot of our smoked fish through mail orders. We also ship a lot of frozen fish to other states.

We process king, coho, sockeye, pink and chum salmon. We process halibut, crab, scallops, mussels and black cod. If it wiggles or swims, we can probably process it!

Our shop is open year-round, but we buy our fish in the summer. Some days we work 12 hours! A lot of my work is in the office, keeping track of the bills. But sometimes I move *totes* of fish with the forklift. And sometimes I help Ken, our filleter load the smokehouse. Sometimes I salt fish, vacuum pack or label boxes. To us, quality is really important.

I used to be a *hand troller*, and I used to have my own seafood shop. Now as a fish smoker, I've seen another side of the business. Seafood is good food. That's for sure.

Level II Animals of the Seas and Wetlands

Card 7

AKCIS ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Cannery and frozen food workers preserve and pack food products. In Alaska, the type of food is almost exclusively limited to fish and shellfish. Workers in this field work for long periods handling and packaging the product.

Opportunity is excellent to very good with 5,865 employed. Wages range from $900-$1,100 per month *[AKCIS, 1989]*. Much of the training is on-the-job. Good background courses include basic math and physical science. No Alaska postsecondary school has a program leading specifically to work in this field.

Related occupations include food processors packers and wrappers. Food processing or handling experience is helpful but not required for these jobs. Many jobs are filled in advance, but some hiring is done during the peak season. Some plants hire union workers and a lot hire students who aren't in school in the summer. Seafood processors utilize practical scientific and technological food processing data and procedures in the marine food processing industry.

Packers and wrappers assemble cartons, insert products into containers, and seal and label containers for shipping. Machine operators tend machines that pack, mark, wrap, and sort. They also replenish packaging supplies. They observe machines to detect malfunctions. They also make minor repairs and adjustments.

Activities:

1. Invite someone to class who smokes fish or visit him/her at work. Prepare some questions beforehand. Back in the classroom students draw pictures of the fish smoker at work. Make sure students give the fish smoker a name.

2. As a group students make funny seafood recipes. For example:

Whale Stew
1 whale (medium size)
Optional: 2 swordfish
Salt and pepper to taste
Brown gravy (lots)

Cut whale into small bite-sized pieces. This will take about two months. Cover over kerosene fire about 3 weeks at about 325°. This will serve about 2,600 people. If more are expected, two swordfish may be added. But do this only if necessary, as swordfish can get caught in peoples' throats. Write the recipes on the board. Students then draw pictures of the various seafood dishes.

3. Each student thinks up a "wonder why" question about fish smoking and other seafood processing. The teacher writes the questions down. Students then consider the questions and try to find the answer over a several day period.

4. Bring some smoked salmon or other seafood products to class. Sample different products from different companies. Are they different in taste? How are they made? (Resources: Alaska Seafood Marketing Institute, P.O. Box DX, Juneau, AK 99811 (907) 586-2902.)

Fish Leather Crafters

My name is Roger Lewis. Our business is called Alas-Skins. We make leather goods from fish skin. Fish skin makes beautiful leather. We use the leather to make wallets, purses, shoes and belts.

You may wonder how to make leather from fish skin. It's not easy. First, we buy fish skins from fish processors. Then we wash the skins and scrape all the scales off. Next we soak the skins in tanning solutions. Our exact tanning method is a secret. The chemicals make the leather clean and soft. Then we press the leather with a giant iron. Pressing the skins locks the scale pockets down. The scale pockets are where the scales were. Then we tack the skins on boards, stretch them, dye them and tack them in place to dry. When they're dry, we hand-rub the skins so that the little pockets the fish scales were in stand out. After we've rubbed the skins well, we send them to our manufacturing plant. They sew beautiful wallets, purses and belts from them!

People used to have purses and shoes made of alligator and snake skin. Then, some reptiles started going extinct. Extinct means there wouldn't be anymore. So people stopped buying reptile skins. But one of my partners noticed something. Scale pockets make salmon skin look like reptile skin. At that time processors were throwing perfectly good fish skins away. So, we found a use for the fish skins people were just wasting. That makes everybody happy! The fish that makes the best leather is the chum salmon. Alaska has lots of chum salmon, so there's no danger of extinction.

Our products are *Made in Alaska*. So, the next time you see a salmon, don't just think of biology and don't just think of food. Think of purses, wallets, belts and shoes made in Alaska, by Alas-skins.

Level II Animals of the Seas and Wetlands
Card 8

Leather Crafters process, tan, dye and sew leather into useful items such as wallets, purses, belts and shoes. They may be involved in the marketing and sales of items and accompanying business work. Designing the leather items may involve art and design. Related work includes handcrafters, graphics artists and designers, clothes designers, patternmakers and store salespeople.

Handcrafters create and manually make a wide range of artistic and practical items for sale. In Alaska, this may include traditional crafts as wood, ivory, and soapstone carving, basketry, and leather work. Other crafts handcrafters create include pottery, weaving, jewelry, woodworking and leatherworking. Handcrafters also perform tasks including selling the items and doing minor bookkeeping.

Opportunity varies in Alaska with 2,500 employed. Wages vary greatly. Good background courses for this profession include basic math, physical science, oral and written communications, history, art and graphic communications. No Alaska postsecondary school has a program leading specifically to work in this field. Related professions include small business operators and jewelers. Most handcrafters are self-employed. Many handcrafts are sold to tourists. Success in selling is therefore tied to changes in that industry. Tourism is expected to do well in the near future.

Store salespeople display and sell merchandise in retail and wholesale stores. They provide general information about the product and assist and advise the customer. They prepare sales slips or contracts. They receive payment or credit card. In small stores they may do the ordering, pricing, display work and inventory.

Activities:

1. Send a letter to Alas-Skins (P.O. Box 33755, Juneau, AK 99803) and ask for their brochure and a scrap sample of salmon leather. Write them a class letter with your ideas of other ways salmon leather can be used.

2. Cut gray and white construction paper in the shape of opened fish skins. (Imagine a filleted salmon, opened and tacked on a board). Students draw fish scales on their "fish skins," then form them into small purses and pouches that they can take home.

3. Try cleaning and tanning a fish hide as a classroom project. Some publications on skin tanning can be obtained from Cooperative Extension Service, University of Alaska-Fairbanks, 303 Tanana Dr., Fairbanks, AK 99701. Form the tanned skin into a handcraft.

4. Brainstorm places where fish go after they're caught. (Boat holds, processor, freezers, restaurants, homes, dinner plate). Draw pictures of these places and duplicate for students to color, label, and identify the order or by drawing arrows.

U.S. Coast Guard Personnel

US COAST GUARD
STATION
COAST GUA

My name is Jim Argenbright. In Coast Guard language I'm a Boatswain's Mate. As a Boatswain's Mate, I drive boats. You pronounce boatswain like *bosun*. I work at a search and rescue center. When people get in trouble on the water, I help them. I operate a rescue boat. The rescue boat I go out in is 41 feet long. It has really powerful engines which make it go very fast. It can go 26 knots which is pretty fast for a motor boat. On the rescue boat we have life preservers, fire extinguishers and pumps. The pumps are used to pump the water out of boats that are sinking. Sometimes we tow boats that are in trouble. Another job I have is to check that boaters have enough life preservers. If they don't have enough life preservers, they can get a ticket. When they get a ticket, they have to pay a fine. That means they have to pay a lot of money.

When I first went into the Coast Guard, I had to go to boot camp. At boot they gave me a really short haircut and I had to march a lot. Then I was stationed on a 378-foot ship out of Seattle. We went on long patrols on the ship. Sometimes I didn't get home for two or three months. But I loved being out on the ocean.

When I'm not rescuing people I'm busy practicing my skills at the Coast Guard station. Other times I help to clean and maintain the station so everything is shipshape when there's an emergency. One time there was a huge pier fire in Haines and we had to dash under the burning dock to put the fire out. That was a little scary, but I'm glad I had fire training.

When I decided I wanted to be in the Coast Guard, I went to an enlistment office. When I enlisted, that meant I was in for four years. I agreed to stay in the whole four years. I knew I wanted to work with boats, that's why I wanted to be a boatswain's mate. I've been in the Coast Guard for 7 years. It's taught me about boats, about search and rescue and about the sea.

Level III Shells and Insects
Card 1

U.S. Coast Guard Personnel are responsible for the protection of the nation's coastline. They regulate foreign and domestic fishing within U.S. coastal waters, promote recreational boating education, and maintain navigational markers. All tours of duty are within areas under U.S. jurisdiction.

Military enlisted personnel are employed by the Army, Navy, Air Force, Marine Corps, and Coast Guard. Specialties range from basic combat to fields like electronics, medicine, accounting, computer science, aviation administration, food service mechanics, communications, and law enforcement. Opportunities in the military are excellent in Alaska: 24,500 are employed. Wages range from $1,300-$1,600 per month *[AKCIS, 1989]*. A high school diploma or GED is required for enlistees. Good background courses include basic math, oral and written communications, psychology, sociology, physical education and general shop/mechanics. The military offers many types of jobs in almost any field.

A high school diploma is preferred. Applicants must take an interest and aptitude test and a physical. Enlistees make a legal commitment to remain for a period of at least 2 years in the Army and 3 to 4 years in the other services, and then serve in the reserves to bring the total up to 6 years.

U.S. Navy Personnel perform a broad range of duties that involve seaborne military functions. Extensive research and development in ocean-related disciplines are carried out.

Military Officers hold leadership and supervisory positions in the Army, Navy, Air Force, Marine Corps, and Coast Guard.

Activities:

1. Write U.S. Coast Guard recruiters for recruiting information. Have students cut out photos of U.S. Coast Guard personnel at their jobs and make a display out of them. The address: United States Coast Guard Recruiting, 300 E. Dimond, Anchorage, AK 99515 (907) 271-2447.

2. Invite a U.S. Coast Guard person to your classroom to demonstrate search and rescue equipment. Be sure to ask him or her about their job. Each student should prepare a question beforehand to ask the Coast Guard person. As a follow up, have the students demonstrate correct search & rescue procedures for a "lost" student on the playground.

3. Draw pictures of U.S. Coast Guard personnel at their jobs. Below each picture write what that Coast Guard person is doing.

4. Ask the students what kinds of jobs the Coast Guard does. As they raise their hands and offer possibilities, write them on the chalk board. Narrow the jobs down to eight. See if they can match the duties the students identify with the actual mission of the Coast Guard: 1) boating safety 2) defense preparedness 3) search and rescue 4) aids to navigation 5) merchant marine safety 6) environmental protection 7) maritime law enforcement and 8) port safety. Then ask students to, when called on, pick one of those jobs and tell a brief make believe adventure story based on that job, something that happened, and how they, in their make-believe Coast Guard job would act and react.

5. Bring life preservers and other boating safety equipment to class and demonstrate their use. Have students prepare for an imaginary boating trip, making sure that all their safety equipment is in order. Designate one area of the classroom or playground the "boat", and after students are prepared, have them "climb aboard." Then, one of the students, designated "Coast Guard Person", pull up in his or her boat and check that all safety equipment is in order.

Cruise Ship Naturalists

My name is Sharon Nogg. I'm a cruise ship naturalist on the *Nieuw Amsterdam.* The Nieuw Amsterdam is a giant cruise ship that visits ports in Southeast Alaska all summer. As cruise staff naturalist, I help the passengers learn more about birds and animals, glaciers and the sea. Cruise ships are amazing. The Nieuw Amsterdam holds 1200 passengers and 365 crew. It's like a floating city!

But people don't go on cruises just to eat and exercise. They visit Alaska for breathtaking scenery. Also, they want to know more about what they see. In my slide shows and talks I help them better understand bald eagles, brown bears, killer whales and the spruce forest. I help them identify birds and to recognize local flowers. On this job you have to like people. I answer a lot of questions, and if I can't answer a question, I try to find the answer. Some questions are kind of funny. One man asked me where the penguins are! I told him that penguins live in Antarctica, not Alaska! He was disappointed! I encourage the passengers to get off the ship and take forest hikes or walks along the beach. I also encourage them to take helicopter or plane tours of the magnificent glaciers.

On the ship the hours are long. Also, it gets a little lonely away from my family and friends. But every day the maid cleans my room and makes my bed. I eat wonderful meals on the ship. And, with my food and room provided, I save most of my paycheck! Plus, I get to travel all over. That's why I do it!

Level III Shells and Insects

Card 2

Tour guides conduct visitors through museums, historic sites, parks, and other places of interest while providing commentary. They give tours of glaciers, tundra, seafood canneries, pulp mills, and mines and conduct visits of villages, towns, and cities. They may operate a car, van or bus or work on a vessel while describing points of interest. Opportunities are good to very good in Alaska: 220 are employed. Wages range from $800-$1,500 per month *[AKCIS, 1989]*.

Suggested training includes completion of an approved training program at a community college or vocational/technical trade school. Good background courses include basic math, physical science, oral communications, psychology, sociology and auto mechanics. No Alaska postsecondary school has a program leading specifically to work in this field. Related occupations include bus and taxi drivers, park rangers and recreation guides. For naturalist positions, a background or college in the natural sciences may be required.

Employers prefer neat, polite, articulate, and enthusiastic tour guides. Tour guides may have to be 21 or 25 years old and have a good driving record for positions that require driving. Some employers require at least 2 years of college. Prior work experience meeting and assisting the public is useful. Oral communications are very important, as is background knowledge about the area in which the tours are given.

Recreation leaders organize, teach, and conduct recreational activities for adults and children. They explain rules, supervise to enhance safety, enjoyment, and skill in such activities as arts and crafts, sports, music, dance, dramatics. They may demonstrate camping equipment and techniques.

Activities:

1. Visit a cruise ship or other passenger vessel and interview a member of the crew (or ask a crew member to the class). Prepare some questions beforehand. Or, in the classroom, identify what would be interesting for visitors to learn about your area.

2. Watch a video of *The Love Boat* or a movie depicting life aboard a cruise ship. Afterwards, as a class discuss how real or fabricated you think the life depicted really is. Each student writes a paragraph discussing the kinds of things the program emphasizes as well as the kinds of things it leaves out. Afterwards discuss other ways television and movies may "change" things for entertainment's sake. Several students can research famous cruise ships of today and famous cruise ships of history. The *Queen Mary*, the *United States*, and the *Titanic* (and *Noah's Ark!)* may come to mind. Have them give their report either written or out loud. All students then brainstorm why cruise ship feats and defeats stand out in the history books.

3. On a map of Southeast Alaska (available from the U.S. Forest Service or from Alaska Northwest Publishing) lay out with yarnthe routes and probable routes of cruise ships in Alaska. What would be some other ports ships may visit? If you find out the particular routes of individual ships, you could plot their travel on the map with different colored yarn. Write for information about Alaska cruises. Ads can be found in a number of major magazines, from travel agencies, or through the Alaska Division of Tourism, P.O. Box E, Juneau, AK 99811. Make a display highlighting the material you find.

4. Several students may find and interview someone who has taken a cruise on a cruise ship. Have them make a report about what they find out. Using a microphone and without notes stand in front of the class, like a tour guide tell about some type of Alaskan animal. Students may also talk briefly about the forest or even the fishing industry. They need to pretend that their audience is made up of tourists from Outside.

Performing Artists

My name is Molly Smith and I've been artistic director at Perseverance Theatre for 12 years. Perseverance Theatre is in Juneau but some of our plays travel around the state. Our plays have been performed in New York City, New England and one even went to France!

As artistic director, I help decide which plays we perform. Some weeks I read as many as 10 plays! Lots of the plays are about the sea. Our recent play, *Odyssey*, featured a man in Greece long ago. The man sailed on the sea and had many adventures. We had a play about a mother and daughter on an island in the sea. Another play was about an enchanted halibut beneath the sea. Still another play was about a fisherman in Wales and how he made his living on the sea. To me the sea is like life itself. That's why the sea is important in so many plays.

A play takes place on a stage, as you know. So, how do we bring the sea to the stage? Very carefully! We use lights, silk curtains, and sometimes water sounds to remind people of the sea. We use senses other than sight to make the play more real. Theatre is a celebration. The sea makes people celebrate in other ways, too. Sometimes they sing about the sea. Other times they write about the sea. Sometimes they dress up like sea animals. Sometimes movies and television programs are made about the sea. The sea, lakes and rivers are all around us, especially in Alaska.

Working with theatre is a good way to get to know people. A good performance involves a lot of rehearsal. That's the part I love. In theatre we're creating a work of art that you watch and then it's gone. Like the sea, the performing arts represent life. I think that's special.

Level III Shells and Insects
Card 3

Performing artists entertain audiences in situations on stage, on TV, on radio, and in motion pictures by singing, dancing, acting, or playing musical instruments. Opportunity in this profession is limited. About 190 performing artists are employed in Alaska. Wages vary with the specialty of the performer. Specialty courses are offered at colleges, universities, at community theaters or from other performers. Good background classes for a student include basic math, physical science, oral communications, history, music and art. Alaska postsecondary training sites include the University of Alaska-Anchorage, the University of Alaska-Fairbanks and the University of Alaska-Southeast.

Related occupations include modeling. To be a performing artist, it helps to have proven proficiency as an actor, dancer, musician, or singer. Candidates for performing artist jobs may be required to audition before prospective employers. Alaska's small and dispersed population limits opportunities in this field, but many find employment as music or acting teachers and tutors. Those working in musical groups performing at nightclubs have a fair chance of working full-time. This occupation also exists in the military services.

Composers have also drawn from the rich maritime heritages of countries around the world to give their musical pieces life.

Radio and television broadcasters broadcast news, weather, commercials, sports, and live events. They play music, host programs, and run switching and transmitting equipment. Opportunity in Alaska is good to fair with 280 employed. Wages range from $1,000-$1,800 per month *[AKCIS, 1989]*. Much of the training is on-the-job. Suggested training includes completion of an approved training program at a community college or vocational/technical trade school or college.

Activities:

1. Invite someone involved with the performing arts to class or visit him/her at work. This person may be someone involved in public speaking, broadcasting, acting, drama instruction or drama study. Prepare some questions beforehand. Ask him/her about skills involved in the performing arts.

2. Have students pick a sea animal. Give them a few minutes to quietly imagine how their sea animal would act. Pick a student. Have that student come to the front of the class and act like that animal. Have all the other students try to guess what that animal is.

3. Develop a classroom poem about seaweed. When it's done have students take turns performing the poem for the class or other classes.

4. Invite an actor or actress to class or along on a Sea Week/River Week hike. Ask the performer to act out sea animals which the students name. Have him/her get the students to identify the skills it takes to be an actor or an actress.

5. Have the students identify a movie, TV show or story they know about the sea. Ask the student to recall the story and tell it to the other students. Then ask one student to re-tell the story, but to make a change. Ask a third student to re-tell that story with another change.

Painters

My name is Diana Tillion. I'm a painter. But I'm different from other painters. I paint with *octopus ink!* Octopus ink makes wonderful brown shades. I'm the only professional artist who paints with octopus ink.

One octopus can supply me with a small amount of ink. But the color is so dense it goes a long way. The ink is very pure and doesn't rot. I catch about three octopi a year. That's enough ink for eighty paintings! And, I don't waste anything. The ink goes for paintings and the octopus goes in the cook pot! I catch octopus when there's a minus tide. I look for holes in the rocks with shell fragments in front of them. One octopus I caught weighed 47 lbs.! I got lots of ink and made dozens of octopus fritters from that one!

Some children ask me how to become an artist. I tell them to always carry a tablet and a pencil to draw pictures. Make sure your pencils are sharp. And I tell them to watch things very closely. One time I went out on my boat in a storm just to see how the boat rode on the waves. When you're learning to sketch, you're learning to see. The scene I painted from that trip now hangs on the wall in an Anchorage office.

I've had my own art gallery in Halibut Cove for 20 years. I also sell paintings in shows in Anchorage, Fairbanks and Seattle. Sometimes I use colorful paints like other artists, but I always come back to octopus ink. By mixing a little bit of octopus ink with so much water, I can get hundreds of shades of brown.

I love to just go sit by the sea. I see driftwood and sand, waves and rocks. The rich brown colors of octopus ink help me paint the scenes I see. Like beautiful Kachemak Bay, octopus ink is a gift from the sea.

Level III Shells and Insects
Card 4

Painters use maritime settings even more, perhaps, than authors. Marine scenes have always attracted artists and viewers alike.

Sculptors often specialize in creating works that represent different forms of marine life. Others create their works from materials that are from the marine environment.

Graphic artists and designers portray ideas through art work to call attention to products, services, or opinions. They prepare art work for newspaper and magazine advertisements, books, business signs, and package designs. Their duties may include painting or drawing and may require a specialty such as lettering, cartoons, or illustrations. Employment opportunity in Alaska is considered fair with 1,424 employed at a wage of $1,200-$2,300 per month *[AKCIS, 1989]*.

Suggested training includes completion of an approved training program at a community college, university or vocational/ technical trade school. Suggested courses include basic math, physical science written communications, art, history, graphic communications, marketing and distributive education.

Alaska training sites for graphic artists and designers include the University of Alaska-Anchorage and the University of Alaska-Fairbanks. Related occupations include interior designers and decorators, clothes designers and patternmakers, floral designers, photographers and printing production workers.

Activities:

1. Invite a painter or other fine artist to the classroom or visit a painting gallery. Prepare some questions beforehand. Back in the classroom students write and illustrate a sentence about what they saw.
2. Have students make a sculpture by hanging seaweed from fishing nets.
3. Have student draw a picture of somebody drawing a picture of a sea setting. Some of the world's most famous paintings have been of the painter painting him or herself painting!
4. First, have students make play money in 1s, 5s, 10s, 20s. Each student receives $50. Then each students paints or draws a picture of a sea scene or of people working on or by the sea. Students can glue beach-collected materials to their paintings. They need to make a frame around their pictures and place them on the wall in the classroom or in the school hall. Students then "purchase" another student's painting. They may "resell" the picture to another student at will. Discuss marketing of art and the job of fine artist, especially as it relates to natural scenes and scenes related to the seas, coasts and rivers.
5. Have the students each complete 10 drawings or paintings–then have a "SHOW" with each artist's work displayed and explained by another student, followed by another student. Students discuss different artistic techniques and personalities.

Aquatic Entomologists

My name is Dr. Sandy Milner. I'm an aquatic entomologist and I live in Anchorage. Aquatic entomologists study insects that live in the water.

What good does it do to study freshwater insects? I'll tell you. Some scientists believe the best way to test for clean water is to measure the temperature, the pH, and the chemical makeup of the water. Entomologists like me, though, count the bugs. We not only count how many bugs there are, we count the number of different *species* of bugs. Insects can't stand pollution and if their environment is polluted, they may die. So, studying the insect and other invertebrate populations in streams tells us how clean the streams are. Presto! We have a good way of measuring pollution. Entomologists are also interested in history. We compare the insects that used to be in certain streams with the ones found there today. That way we can see if things have changed. Aquatic insects are important. Fish, especially salmon, eat them!

I'm one of the few people who go to Glacier Bay National Park to study bugs. One time while tourists were snapping pictures of the Margerie Glacier, I was jumping up and down with excitement. Why? Not because of the glacier; because I had discovered a *midge* that nobody else had seen before! It was a new species to science. (A midge is like a gnat.) Now that's excitement!

If you gave me a jar of water from any river or stream in the world, I could tell you a great deal about it. I could tell you if it was polluted or clean. I could tell you if it's tropical or from the north. I could tell you if the water came from glaciers or from farmland. To an aquatic entomologist, water from a stream is like a big puzzle. Eventually we put the puzzle together and we get the picture.

Level III Shells and Insects
Card 5

Entomologists may pursue a new field in entomology–determining the effects of pollution on streams by examining their insect populations. Entomologists work in government agencies, research centers in universities and, increasingly, in "agribusiness." Being an entomology technologist usually requires a bachelor's degree. To direct research requires an advanced degree and additional studies. Most entomologists are engaged in activities that are directed toward managing insect populations They look for means to control harmful insects and try to increase the impact of desirable insects.

Employment opportunity is limited in Alaska. Wages range from $1,700-$3,300 per month *[AKCIS, 1989]*. College and/or graduate studies are required for entomologist and entomologist technician jobs.

Good background courses include advanced math, biology, physics, chemistry, oral and written communications, sociology and computer applications. Suggested Alaska training sites include the University of Alaska-Anchorage, University of Alaska-Fairbanks and University of Alaska-Southeast. Related occupations include university and college teachers, plant scientists and limnologists.

A bachelor's degree is adequate preparation for some beginning jobs; however, those interested in a career in this field should plan to obtain an advanced degree due to intense competition for most biological jobs. A doctoral degree generally is required for college teaching and independent research. For additional information: American Institute of Biological Sciences,1401 Wilson Boulevard, Arlington, Virginia 22209.

Activities:

1. Use a tea strainer to collect insects and larvae from a stream. Study the insects under the microscope if available. Students draw what they observe. Brainstorm reasons an entomologist would study insects.

2. Observe and draw stages of development in insects.

3. Find out what kind of education it takes to become an entomologist and find out where the student can pursue such studies in Alaska.

4. Order a private entomology report. Decide the types of information that report can offer. (These reports are completed for the Alaska Department of Fish and Game, Box 3-2000, Juneau, AK 99802 and for municipalities such as The Municipality of Anchorage–see below.)

5. Obtain and browse through *the* texts in the realm of freshwater ecology–The Ecology of Running Waters and The Biology of Polluted Waters by Noel Hynes, University of Liverpool, U.K. Order the excellent posters *Food Chain of an Anchorage Stream* and *Impacts of Pollution on Aquatic Life* from the Water Quality Section, Environmental Services Division, Dept. of Health and Human Services, Municipality of Anchorage, P.O. Box 196650, Anchorage, AK 99519-6650 and place them on the wall. Students may color these posters with crayons.

6. Have students draw their own insects and give the species a name. Below their insect they need to describe the insect, its habits, where it lives and other pertinent data. Use an insect identification field book for a model.

Environmental Health Officers

My name is Mike Ostasz. I'm an environmental health officer for the Department of Environmental Conservation. What do I do? I inspect shellfish to see if they're okay for people to eat. Shellfish are clams, mussels, oysters and scallops. They are so delicious! You can dig them, find them at low tide or scuba dive for them. Some Alaskans grow them in nets and trays. Farming in the sea is called *mariculture*. Shellfish are delicious to eat, but in some cases they can be deadly. Shellfish pick up poisons from algae in seawater. The poisons can cause paralytic shellfish poisoning (PSP). PSP can make you very sick, or it could kill you. So, I test some places where people dig. I also test every commercial mariculture sites for PSP and other contamination.

The reason I test the water is that shellfish are *filter feeders*. They take in food from the water. One clam or mussel can pump over 200 gallons of water per day! We test sites by testing the water. We test on the top of the water and underneath the water. We also test streams nearby to see if they are clean. We test oysters and other shellfish inside and outside of the oyster pens. Then we test the shellfish before they go to market. That way they're perfectly safe when you buy them. You know who also loves shellfish? Sea otters. One time when we were testing a site I watched a sea otter swimming on his back in the water eating clams. Two killer whales were coming. The otter didn't see them. The orcas came from different angles. There was lots of splashing, then blood. The sea otter was killed. Sometimes that's how nature is.

On my job I get to see lots of beautiful places and help Alaskans. I help them enjoy shellfish safely and sell shellfish products safely. Would you like to taste an oyster?

Level III Shells and Insects
Card 6

Environmental health officers plan and conduct programs related to sanitation. They promote the maintenance of health standards, and monitor the use of oceans for waste disposal. They also enforce laws regarding handling, dispensing, and consumption of food from coastal waters as well as inspect and regulate the handling, processing, and serving of food in restaurants, dairies, food and seafood processing plants, hospitals, and schools. They work to ensure that the disposal of sewage, garbage, and industrial waste meet minimum governmental health standards. They also monitor air and noise pollution sources and recommend control measures. Opportunities are good to very good in Alaska; 35 employed. Wages range from $2.400-$3,000 per month *[AKCIS,1989]*. College is required or equivalent or appropriate training and experience.

Good background courses include advanced math, biology, chemistry, psychology and sociology, oral and written communications, health education and government. Suggested Alaska training sites include the University of Alaska-Anchorage, University of Alaska-Fairbanks and University of Alaska-Southeast. Related occupations include health and safety inspector, quality control inspectors and medical laboratory technicians. A bachelor's degree in environmental health or a related science is advantageous for most positions. A master's degree in public health helps to compete for higher level jobs.

Environmental health services toxicologists detect and analyze poisonous substances in the oceans.

Activities:

1. Invite a microbiologist or environmental health officer to class to describe their job. Have students prepare some questions beforehand. Ask him/her to bring in some of the tools of their job. Afterwards, students should write a description of that person's job in their own words.

2. Define and discuss paralytic shellfish poisoning (PSP). Go over its causes and ways that it is tested for. Identify the role of the microbiologist and environmental health officer in the testing. Identify different species and explain the risk of PSP within species and with certain body parts from that species. (Resources: *"PSP What you should know before you go clamming,"* and other materials, Alaska Dept. of Environmental Conservation, 3601 C St., Suite 1324, Anchorage, AK 99503; *"Cook Inlet Razor Clams,"* Alaska Dept. of Fish and Game, Box 3-2000, Juneau, AK 99802-2000; *"Paralytic Shellfish Poisoning,"* Cooperative Extension Office, A-00220.)

3. Show food chains for various animals, beginning with microbes. Draw the food chains on the blackboard. Brainstorm reasons why environmental health officers and microbiologists consider the food chain when assessing seafoods for possible contamination.

4. Draw a picture of a microscope on the blackboard and identify its parts. Students examine tissue from clams under a microscope and write down what they see. Students should brainstorm the uses of the microscope to the environmental health officer or microbiologist.

5. Students mark a line down the center of a piece of drawing paper. On one half of the paper they draw their own picture of a microbe. On the other side of the paper they draw where the microbe might be found (in a stream, pond, along the seashore, etc.). Brainstorm ways that microbes can pollute foodstuffs and ways environmental health officers might test for pollutants.

Seafood Shop Managers

My name is Sharon Kovaleski. I manage a seafood shop on the Homer Spit. The Homer spit isn't something kids do with their gum! The Homer Spit is a long strand of sand that stretches out into Kachemak Bay. Our shop is located on that strand of sand. We take fish from two kinds of fisherfolk. First, we buy salmon, halibut and crab from commercial fishers. We process that fish and re-sell it. Second, we exchange sports-caught fish for prepared fish. That way people can come in with the fish they caught and leave with frozen or smoked fish. They still have to pay some money, though.

We're also a seafood store. We sell canned smoked salmon, canned fresh salmon (not smoked), canned fresh halibut and vacuum packed smoked or frozen fish. If the customer wants their fish in fillets, we do it. If they want fish steaks, no problem. Even if they want their fish barbecued or in chunks, we'll do that too. We then freeze their fish and vacuum pack it and ship it to them. We also make salmon jerky and *squaw candy*. Squaw candy is dried sockeye salmon. Boy is it good! This morning I sold some fresh-cooked dungeness crab. They were such nice ones! Those customers had big smiles when they walked out of here! When you sell things in a store it's important to be really nice to the customer. And since I'm the manager, I always make sure the customer goes away happy.

And there sure is a lot of work here. There's fish buying, fish sliming, crab cooking, and order filling. There's vacuum packing, fish filleting, flash freezing, and product boxing. We work until way past 10 at night in the summer. But I've got a dream. I want to be a *fish broker*. Fish brokers help one group of people buy lots of fish from another group. I think that would be a neat job.

Well, I've got to get back to work. The summers are busy! But before you leave, would you like to taste a little smoked sockeye? I thought you would.

Level III Shells and Insects
Card 7

Food service managers supervise the employees and operations of food and beverage establishments. They also determine selling prices, set policies, determine need for food and supplies, conduct advertising campaigns, hire personnel, and assume overall responsibility for customers, workers, and profit goals.

Employment pportunity is fair in this profession with 403 employed statewide. Wages range from $1,200-$2,000 per month *[AKCIS, 1989]*. Suggested training includes completion of an approved training program at a community college or vocational/technical trade school. College may help. Suggested background courses include basic math, physical science, oral and written communications, psychology, accounting, home economics and marketing and distributive education.

Alaska training sites include Alaska Pacific Univ. and the Fort Wainwright Army Education Center-Fairbanks. Similar jobs exist as hotel and motel managers. Promotion from within the firm is common. Experience in all areas of restaurant operation is important. Employers in large facilities may prefer those who have college preparation in business administration, food preparation, sales, management, marketing, and related fields.

Food processing workers prepare raw foodstuffs and combine ingredients to make various food products. They tend a chopping, mixing, or cooking machine. They watch conveyor belts and handle food to sort or package it. Opportunity as a food processing worker in Alaska is good. Wages range from $1,000-$1,700 per month *[AKCIS, 1989]*. Training is on-the-job. Good background courses in school include basic math and physical science. No Alaska site has a course of study specifically tailored to employment in this field. Related employment includes cannery and frozen food workers and packers and wrappers. Experience is helpful but not required. Most skills are acquired on the job.

Activities:

1. Invite someone who works in the seafood processing or preparing industry to the class or visit them on the job. Prepare some questions beforehand.

2. Crab cake Cookery: Make sure students wash their hands before handing and preparing food. Pre-cook crab or cook in cooking center. Cool and separate crab meat. Knead 1 cup crab meat, 1 egg, 1 cup flour and 1/2 diced onion together. Lightly spice with garlic, basil, pepper and salt. Form into cakes. Fry in hot oil, turning until golden brown on both sides. Serve on paper towels. Present to the class or to another class with a sprig of parsley. Discuss the importance of sanitation in the restaurant business, especially when dealing with seafood.

3. Learn how to clean and filet fish properly. Invite a local expert to demonstrate if you can. Make sure students understand the importance of knife safety.

4. Make a menu for three meals using available regional marine, aquatic or riverine resources such as crab omelettes, shrimp, variety salad (lamb's quarter, sunflower seeds, berries, fiddlehead ferns, wild onions etc.), shellfish and fish of all types. Resources: "Paralytic Shellfish Poisoning," Cooperative Extension Office, A-00220; 101 Simple Seafood Recipes, Alaska Northwest Books, Box 3007, Bothell, WA 98041-3007; "Wild Edible and Poisonous Plants of Alaska," Cooperative Extension Service, University of Alaska, 1976.

Bush Pilots

My name is Steve Hamilton. I'm a bush pilot for Mountain Aviation out of Sitka. Bush pilots fly small planes in Alaska's rural areas. Bush planes are either on wheels or on floats. But in Southeast Alaska we mainly fly amphibious planes–which have both floats and wheels. I'm usually in a Beaver or a 185. Those are types of small airplanes. All the hours I've flown over the years would add up to over 6 years in the air.

Sometimes I think I'm a glorified bus driver because I haul things around. I've hauled sports fishermen, hunters, tourists, film crews, miners, searchers, even a toilet! One time I even hauled a bunch of ducks for researchers. I've flown into huge volcano craters and over thousands of caribou. A lot of the time, though, I'm just hauling the good old U.S. Mail and a couple of paying passengers. In Alaska you've got to know how to fly the airplane and how to fly it well. Bush pilots have to stay sharp. If you get sloppy, you can get into trouble. Safety always comes first.

The hours are long in this business. Also, what may seem glamorous is lots of the time only routine. Plus, there's always a risk. But I wouldn't have changed this experience for the world. One time I flew some airline pilots. We looked down at the glistening sea and the jagged shoreline and surf and they told me I had it made. They wished they could fly bush planes like me.

As far as I'm concerned there's no place in the world as beautiful as the coast between Sitka and Yakutat. I get to see that coast all the time. You could say I'm pretty lucky, I guess. Would you like to come along?

Level IV Glacial and Intertidal Ecology
Card 1

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Pilots and flight engineers fly and navigate aircraft to transport passengers and cargo. Pilots operate the flight controls and supervise the crew. Copilots assist in communications, monitoring flight instruments, and operating controls. Flight engineers help make pre-flight checks and monitor the operation of various mechanical and electrical systems during flight. Bush pilots in Alaska fall under Federal Aviation Administration (FAA) Part 135 "Air Taxis." There is a big demand for 135 pilots in Alaska and requirements include: commercial and instrument ratings and/or airline transport license, 500 to 1000 hours flight time, depending on quality and appropriateness of experience, and at least a minimum of presentable education and personal demeanor. It is much easier to get an air taxi or "bush pilot" job than it is to get a job for the major airlines. Generally, "bush pilots" operate the aircraft by themselves.

Opportunity is fair in Alaska; 1,100 are employed. The wage varies with the employer. Suggested training includes completion of an approved training program at a community college or vocational/technical trade school or college studies. Good background courses include advanced math, physics, oral and written communications and geography.

For major airline jobs, related occupations include military officers. Applicants must have the necessary technical skills and license. Employers look for many more hours of flight time than the minimum Federal Aviation Administration requirements, and prefer a 4-year college degree. Experience in jet and turbine-powered aircraft is highly valued. Persons hired by major airlines usually start as flight engineers.

Activities:

1. Construct a model plane in the classroom. Discuss the important equipment found on any airplane.

2. Have a paper airplane contest. See which plane flies best. Speculate why. Identify some principles of aerodynamics.

3. Make a flight plan. (Find out how to do this from any pilot or Federal Aviation Administration–FAA office)

4. Invite a pilot to class or visit a pilot at the hangar. Ask the pilot to go over the safety checklist. (Do birds do any checking before they fly?)

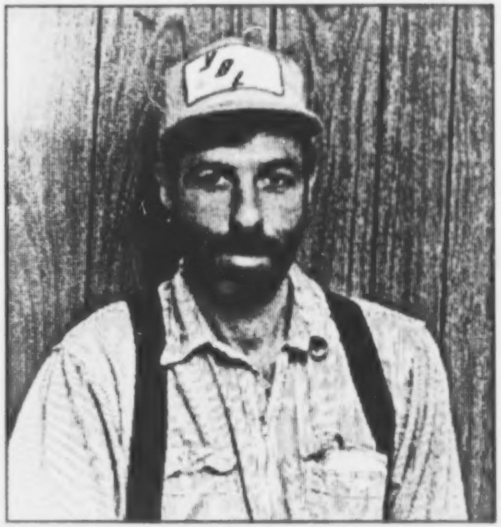
5. Compare features of aircraft with those of birds. Notice when birds are flying around your school and when they are not. Speculate (as a class) what determines when and how high birds fly. (Some theorize that swallows fly at certain altitudes according to barometric pressure. Do you agree or disagree? What do you think controls when birds fly or don't?) How about aircraft? What limitations do they experience? Continue your comparisons between human flight and flight of birds.

Riverboat Captains

My name is Charlie Hnilicka. That's *Ni - li - KUH*. I've been a riverboat captain on the Tanana and Yukon Rivers for the last 13 years. I operate *pusher tugs* like the *Tanana*. The Tanana is 120 feet long. She can push huge 200-foot barges on the river.

The Tanana River spills into the Yukon exactly 192 miles from Nenana. We supply villages up and down the Yukon, all the way to Norton Sound. Some of our push tugs supply villages out in the sound, too. Ruby, Galena, Kaltag, Holy Cross, St. Mary's, Mountain Village, Emmonak, St. Michael: the list of towns we supply is long. The days are long, too. From mid May to late September I work 12 hours a day, seven days a week, pushing a barge down the Tanana, unloading at various villages and towns, then pushing the barge back up the river back to Nenana.

Our push barges have up to 9 crew, but usually there are 6. We have a galley and bunks, just like on ocean tugs. But our boats are different. Where we operate there are no buoys, range markers or lights. We have to know the river by heart. And nobody unloads the cargo for us; we do it all. And what kind of cargo do we transport? Everything it seems! Fuel, trucks, children's toys, snow machines, foodstuffs, mining equipment, and, in the spring, fish to market. There's no cheaper way to get goods in–and out–of Alaska's rural villages. The rivers connect the villages with the Alaska railroads–and Alaska's road system. Alaska's rivers are the highways of the Interior. You know what I like about this job? The solitude. Sometimes when I'm pushing a barge on that huge, majestic Yukon River I look out at miles and miles of open country. It's so peaceful. That's what I like.



Level IV Glacial and Intertidal Ecology

Card 2

Captains are responsible for the operation of the ship, and supervise the deck, engine, and steward's crews, as well as the radio operator. They set the course of the ship and maintain the ship's log. They are responsible for maintaining order, and the safety of the passengers, crew, cargo, and vessel. Although formal education is not mandatory, advancement to a captain's position on some modern and automated ships can be obtained much more easily with formal schooling at a merchant marine academy.

Employment opportunity in this field is good to very good in Alaska. Wages range from $2,000-$4,500 per month *[AKCIS, 1989]*. Much of the training is on the job, though preparatory training includes completion of an approved training program at a community college or vocational/technical trade school. College may also contribute to employment in this field. Suggested background courses include advanced math, physical science, oral and written communications, psychology, sociology, general shop/mechanics, electronics/electricity, drafting and welding. Related professions include deckhands and recreation guides.

Ship officers must have a Coast Guard license and technical skills. Ship officers need a good math background, knowledge of navigation, meteorology, cargo handling, tides, and currents. Engineers need a good math background, knowledge of propulsion systems, electricity, plumbing, metal shaping and assembly, and the ship structure. Training can come from experience at a lower-level job, community college, vocational school, or a 4-year academy.

Activities:

1. Invite a riverboat captain or other person involved in river shipping or marine shipping to class or visit him/her on the job. Prepare some questions beforehand. Back in the classroom students write about what they learned.

2. Find a picture of a pusher tug which works on Alaska's rivers. You might scour old *Alaska* magazines or contact a shipping company. Students should speculate why Alaska's river barges are pushed by tugs rather than pulled by a tow line. Then, contact a river barge company such as *Yutana Barge Lines*, Box 220, Nenana, AK 99760 (phone: 907-832-5505) to see if your ideas are right.

3. Try moving a set weight by 1) dragging it 2) pulling it in a wagon and 3) floating it on a body of water and pulling it. Pull it with a scale that measures pounds and see how many pounds are required to pull the weight each of the different ways. Then, find out transportation costs for a set bulk rate by phoning trucking and barge companies. Compare costs. Speculate why different modes of transportation have different costs.

4. Make a display celebrating Alaska's rivers, *highways of the Interior*. Include drawings of push tugs, barges, explanations of the importance of barge transportation on Alaska's rivers and a state map showing the rivers served.

5. Investigate the historic sternwheeler travel on Alaska's rivers. Thumb through old *Alaska* magazines for information or look through the *Alaska Geographic* series. (Alaska Northwest Books, Box 3007, Bothell, WA 98041-3007)

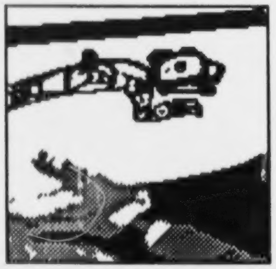
Recreation Guides

My name is Ken Leghorn. I am a wilderness guide. I take people on trips in the out-of-doors. I love my job. I love to be outside and I love to show the wilderness to others. Sometimes we take people on raft trips. Our rafts are filled with air like hard balloons. We put all of our gear in the rafts, then we climb aboard. Some of the rivers we go down have big rapids. We hang on tight when we go over the rapids. Other trips we take are in kayaks. Kayaks are long and narrow like canoes, but they have a covered top. When you look at a kayaker, you only see them from the waist up. The rest of their body is down inside the kayak.

Guides have to know first aid. That's in case a client gets hurt. You might be miles from a hospital. Guides have to know a lot about kayaking, backpacking and the out-of-doors. They also have to really like people. The tourists who go on our trips come from all over–from New York, from Chicago, even from Germany and Japan. Guides help tourists have a safe trip. They lead trips in some of the most beautiful parts of Alaska. Our guides go to Glacier Bay, Admiralty Island, Russell Fijord and other places. Up north guides take people to the Brooks Range, to Wrangell St. Elias National Park, to Prince William Sound and lots of other wild places.

Guiding is fun. I get to be outside and take nice people to beautiful places. Every trip is another adventure. I love to see wildlife on my trips. My clients also love to see killer whales, seals, bears and eagles. They get excited. When they get excited that makes me chuckle.

Guides know that wetlands help wildlife. Wetlands provide food and a place to live for wildlife. Wetlands are some of the best places to take our clients. When I see wetlands, I see good places for clients to appreciate nature. That makes wetlands really special.



Level IV Glacial and Intertidal Ecology
Card 3

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Recreation Guides organize and conduct hunting, fishing, hiking, float, or similar trips for adventurers and tourists in scenic and wilderness areas. They demonstrate equipment and techniques. They also explain rules and regulations. One of their primary duties is to observe clients to ensure their safety. Opportunities are good in Alaska; 638 employed. Wages range from $90-$130 per day. Training is often on-the-job. Good background courses include basic math, physical science, biology, oral communications, psychology, home economics, physical education and general shop/mechanics.

Alaska training sites include the National Outdoor Leadership School–Anchorage. Related occupations include recreation directors and supervisors, recreation leaders and tour guides.

The majority of recreation guides begin as helpers (packers, swampers, etc.) and advance with on-the-job experience. They need a general knowledge of the outdoors and specific skills relative to the type of outfitting or guiding service provided. Big game hunting guides must be licensed. A 6 pack license is required for charter operating.

Activities:

1. Have students climb into an empty plastic swimming pool or other enclosed area and imagine they're on a raft. They have to move up and down as if they're going down river. Have them tell what they "see" as they go downstream.

2. Invite a wilderness guide to the classroom to tell about his/her job. Ask the guide to tell about some of the tourists they have had on their trips. Ask the guide about the kinds of things he/she has to make sure to bring along on every trip.

3. Have students relate wilderness experiences they have had. Maybe some of them showed the woods to somebody else. When they did, they were being wilderness guides.

4. Set up a dome tent or other such self-standing tent in the classroom. If you don't have a tent, set up a tarpaulin in the classroom that they can sit under. Have students sit around the tent or tarp and identify ways wetlands help wildlife. Ask them how wildlife brings tourists to Alaska. Have them imagine that they are tourists sitting around a tent. First the teacher can tell a story, then several of the students can tell a story. One of the stories should be about one of Alaska's wild animals.

5. Have someone who has a kayak or canoe give a demonstration. That person can talk about the history of the kayak or canoe, their place in Alaska Native history, and how they are used today. Discuss the advantages offered by such vessels. Back in the classroom, have students draw a kayak or canoe in a wetlands setting. In this picture they are wilderness guides, taking tourists on a wilderness adventure. What do they see? What kinds of tourists are coming along?

Authors

My name is Kim Heacox. I am an author. I put my research, adventures and thoughts on paper. I mainly write travel and natural history articles and books. My favorite topic is Alaska. Alaska's coasts, rivers, lakes and seas provide the background, setting or topic for much of my work. Sometimes I write about big things like the Prince William Sound oil spill, at other times small things like *pioneer plants* and animals. A real advantage of being an author is that I don't have any set schedule. But that doesn't mean I don't have deadlines to meet! I have a lot of those! I do most of my writing at home. With the computer in front of the window, I can see the Chugach Mountains while I write. Sometimes I get so involved in what I'm doing that I'll write for hours and hours without a break. But there's real satisfaction in seeing a book go to print. To get started as an author it pays to market yourself. That means you have to send out letters and writing samples. At first you can't be as picky about what jobs you'll accept. As you gain experience, you can be more selective. One of the best parts about the writing profession is that I get to go out in the field and find things out for myself. I might go by float plane to Lake Clark, by kayak to Glacier Bay or on foot in the Brooks Range. I take notes and photographs. I interview people. I read what others have written about the area. Then, I put it all together with my own words and thoughts.

I really like the life of a writer. I'm my own boss. I sometimes miss having a regular job, but other authors, photographers, publishers and editors are my co-workers. And it's a special treat to write about Alaska's natural and human resources. Years ago, if people had told me I would be writing books about Alaska's scenery and landscapes, wildlife and people, I would have been very pleased. Now that I'm doing just that, it's even better than I would have thought.

Level IV Glacial and Intertidal Ecology

Card 4

Authors often use the marine environment as a setting for their works. Some authors are noted for incorporating the sea's many moods into their works. Free-lance writers produce a wide variety of written material on a self-employed basis. They may write and submit unsolicited material on subjects of their own choosing, work in prearranged subject areas, or contract on a specific subject. They may write for newspapers, magazines, advertising and public relations firms, private corporations, and government agencies. Suggested training includes college. Good background courses include basic math, physical science, oral and written communications, sociology, history, art, typing, and graphic communications. Alaska training sites include Alaska Pacific University, the University of Alaska-Anchorage and the University of Alaska-Southeast. Related occupations include writers and editors. To attain this job, candidates should demonstrate a proven writing background by submitting samples of previous work. Knowledge of the current trends as well as what the public demands can be as important as writing ability. College courses in journalism, literature, and liberal arts are beneficial. Good grammar, spelling, and punctuation are essential. For free-lance, skills in personal promotion and sales are necessary to secure work.

Activities:

1. Have the students write a class story about a frog or a toad. Each student can contribute one line, which the teacher writes down. Then, read the story back to the students, edit it, then "publish" it. Give each student a copy and post one on the wall outside the classroom.

2. Invite an author to the classroom to read from his/her work. Ask him/her how they got started in their field and some things students could do to improve their writing. Be sure to have the author explain how a book goes from idea to final publishing.

3. Collect tadpoles in spring. Put them in an aquarium and document their metamorphosis into frogs. Attempt to feed them with mosquitos, flies etc. Illustrate their changing appearances. Keep a log of daily observations. Return the frogs to the wild after your study is complete. Write a group story about a tadpole that becomes a frog then...

4. Make a group bedtime story about a swamp frog. Add some other characters such as a mayfly, crane, mallard etc.

5. Write stories about adventures on a glacier. Be sure the stories include descriptions of the glacier and what traveling on the glacier is like. When all the stories are compiled, read them aloud in a class reading. Have other students offer feedback for story revisions. When stories are revised, illustrate them. Bind the stories creating a publication about glaciers. That publication could become part of a series of student-initiated natural resources-related books.

6. Write a letter to an author who writes about nature. Ask him or her about how they became a natural history writer. Discuss ways students can some day get their writing published.

Hydrologists

My name is Stan Carrick. I'm a hydrologist. Hydrologists study the movement of water above and below the surface of the earth. We also study such things as: where water is located, how it moves, how much of it moves from one place to another and the quality of the water. Sometimes I test water to see if water is safe for drinking or if it is polluted. Other times I examine what microscopic plants and animals might be living there.

I like my work. Hydrology is very interesting, and important to all of us. Think of the last time you got a drink of water, washed your hands or used the toilet. Water is part of our everyday life. I like helping people and communities with their water problems. I gather scientific data in the field, then return to the office to look the data over and make reports. These reports help decision makers decide about water and other resources.

One terrific part of my job is getting to see Alaska. That means flying in bush planes and helicopters to remote corners of the state. Sometimes that means floating down wild rivers to collect data. One time a co-worker and I found ourselves on the side of an active volcano at Unalaska! Was that ever an eerie place, with hot steam hissing from rocks as we measured seasonal snowfall on a small glacier on the mountain flank.

My work helps protect fish and wildlife. My data on stream and lake water quality helps fish and game personnel make plans to protect fish. Also I work to establish protected areas (called instream flow water reservations) so that fish, especially salmon, will have enough water to survive. People need water. So do fish and wildlife. As a hydrologist I help assure that both groups have enough pure water for their basic needs.

Level IV Glacial and Intertidal Ecology

Card 5

Hydrologists study water resources, their distribution, characteristics and effects in relation to human activities. Suggested background courses include advanced math, chemistry, physics, biology, oral and written communications and computer applications. A person needs a college degree and at least two years of college science background (a B.S. or graduate degree preferred), including coursework in hydrology, geology and environmental sciences. The person should also be versed in computer operation and have an interest in the outdoors. Job opportunities are available in federal and state governments (and some local governments too), as well as private engineering or hydrologic consulting firms. Alaska training sites include Alaska Pacific University, University of Alaska–Anchorage, University of Alaska–Fairbanks, and University of Alaska–Southeast. A master's degree is required for applied research positions, while a doctoral degree is generally required for basic research, teaching, and administrative positions.

Hydrographic Survey Technicians assume responsibility for operating standard surveying instruments, including bottom grabs, sextants, measuring instruments, depth recorders, wire drags, and navigational equipment. They read charts and assist cartographers in the field. These technicians assist with data acquisition, processing, and analysis, as well as interpretation of the original data. Work ranges from surveying and engineering in tidal and coastal areas to geomagnetic and hydrospace seismological observations.

Activities:

1. Invite a hydrologist, geologist or environmental planner to class (or visit them on the job). Ask him/her about their job, the types of measurements they make, and how decisions about land and water uses are decided.

2. Investigate where the water in your school comes from. Find the person(s) responsible for maintaining and testing your water supply and interview him/her about it. If possible, test your tap water and another sample from a lake or stream in your classroom. Compare the results.

3. Visit a local sewage or domestic water treatment plant. If there are none, find out who tends septic tanks and waste water in your community and discover where your waste water goes. Discuss how that waste water affects plants and animals living in wetlands, streams, lakes, rivers or bays and inlets. Find out where your drinking water comes from. Interview (by phone or in person), the technician who tests your water.

4. Measure (or estimate) the rate of flow, volume, temperature, ph and turbidity (clarity) of a local stream or river. Identify forces which affect the stream, including season, terrain, glaciers, plant debris and human activity. Measure the stream at different times of year and at different times of day. Compare the results. What are some other forces which affect streams and rivers? (To measure the stream flow and volume you'll need a good stopwatch, a tape measure, a yardstick, plus a cork or piece of styrofoam. Measure the stream width at two places ten feet apart, then measure the stream at those places. Average the depth measurements. The more you take, the more accurate it will be. If it covers 10' in 2 seconds, the the of flow is 5'/second. Volume is estimated by flow x width x depth. So, if the stream flows at 5'/sec. and is 10' wide and 2' deep, the volume is 5 x 10 x 2 or 100 cubic feet per second.)

Limnologists

My name is Bob Burkett. I'm a limnologist. That means I study lakes, ponds, rivers and streams. I supervise scientists in the field. Our scientists make *models* of how many fish certain lakes should produce. That number is called the *carrying capacity*. Lately we've been working with sockeye salmon. If a lake is not producing sockeyes like it should, we try to find out why. We may add things to the lake which helps the fish. We may help decide the *escapement*. The escapement is the number of fish which biologists allow to return to the lake to produce *fry*. Fry are young fish.

A limnologist's tools measure water flow, water temperature and how much light gets down into the lake. We also use plankton nets, fish nets and special electronic equipment which help tell how many fish are in a lake. We take samples of water to see what chemicals are in it. We use personal computers. We help identify lakes into which hatchery fish can be planted. But limnologists don't just deal with fish and hatcheries. We might study the effects of placer mining on streams or the flow of lake water over a dam. Our studies can help us know which wetlands are the most productive. That way we can protect them.

In the field we often use aircraft and boats. Sometimes we have to watch out for bears, and pay special attention to the weather. Safety is very important. One day some limnologists were on a skiff near Amchitka and the fog came in so thick they nearly ran into the side of a trawler. Lucky for them! They could have kept going out to sea. Limnologists uncover patterns in nature. Patterns help us analyze *ecosystems*. Knowing more about ecosystems benefits all of us. Alaska is an ideal laboratory. I couldn't think of a better place for this line of work.

Level IV Glacial and Intertidal Ecology

Card 6

Limnologists study freshwater ecosystems in the broadest context, encompassing biological, chemical, geological, and physical parameters. For the State of Alaska their work involves forecasting the productive potential of fish-producing lakes and river ecosystems.

Opportunity is limited. Wages range from $1,700-$3,300 per month *[AKCIS, 1989]*. College and graduate studies are required for limnologist jobs.

Good background courses include advanced math, biology, physics, chemistry, oral and written communications, sociology and computer applications. Suggested Alaska training sites include the University of Alaska-Anchorage, University of Alaska-Fairbanks and University of Alaska-Southeast. Related occupations include university and college teachers and plant scientists.

A bachelor's degree is adequate preparation for some beginning jobs; however, those interested in a career in this field should plan to obtain an advanced degree due to intense competition for most biological jobs. A doctoral degree generally is required for college teaching and independent research.

Limnological Technicians do field sampling work on fresh water lakes. They take water samples, carry out field and laboratory analyses, measure physical parameters, and care for and maintain the sampling and measuring equipment used in limnology. Limnological technicians perform routine lab tasks such as weighing and mixing solutions, and perform quantitative studies on water and the life forms in it.

Activities:

1. Gather some water from a river or stream. Measure qualities of the stream itself such as width, depth, temperature, rate of flow, and clarity. Then, from your sample, measure as many qualities of the water as you can. Compare that water sample with one from another stream or river. Chart your data side-by-side. Identify the tools of a limnologist. List on the board the kinds of things a limnologist could decide with the above information.

2. Visit a biology or other water testing laboratory. Find out ways that water is analyzed there. If you can, analyze some water which you have brought into the lab. Simple sampling equipment can be ordered from scientific supply catalogues.

3. Create a poster charting the life cycle of the sockeye salmon. Brainstorm different ways that life cycle may be enhanced to produce more salmon. Write your ideas on the blackboard. Then, find out ways in which sockeyes actually are enhanced (by asking local biologist(s) or phoning a hatchery). Compare your ideas with those which which actually take place. (Write for the posters *The Importance of Salmon in Alaska Ecosystems* and *Streambed Ecology* from the Alaska Natural History Assoc., P.O. Box 110536, Anchorage, AK 99511-0536.)

4. Look up the word *limnology* in a dictionary. Identify some terms a limnologist might use in his/her job.

Elementary and Secondary Teachers

My name is Gary Holsten. I have been a teacher for 10 years. I love teaching in Alaska. I especially like teaching about the sea, rivers and lakes. Teaching about nature gets me outside. When I was little I spent my free time at the creek. When I take kids to a stream it makes me remember the things I used to discover.

My time outside has taught me how many different kinds of animals there are. Take birds for example. From the bald eagle to the hummingbird, there are many different bird shapes, sizes and colors! It seems that living things are everywhere. Even the smallest drop of pond water has hundreds of tiny things living in it. Another thing that amazes me is how tough life is. A forest fire is terrible. But after a forest fire, plants grow back. Living things are tender, but they are also tough.

Every time I go outside with a group of kids I learn something new. We're really lucky in Alaska because beautiful mountains, seashores and rivers are all around. Sharing the out-of-doors with others is magic. Everybody gets excited. I've learned that anybody can be a scientist. Scientists measure things and write down what they find. My students also measure things and write them down. My students are scientists. We will need lots of scientists in the future to help us protect all the wonderful things that are around us.

A baby dragonfly is called a dragonfly nymph. A dragonfly nymph looks like a space alien. But a dragonfly nymph is alive and it squiggles around in the water. One time when I showed some kids a dragonfly nymph under a magnifying glass, they went wacko. That made me laugh. When they get excited about the woods, rivers and seashores, I feel good. That means they love nature like I do.

Level IV Glacial and Intertidal Ecology

Card 7

Elementary and secondary teachers prepare and conduct instruction through lectures, discussions, and lab sessions. They write, give and score tests. They give grades to students. They consult with parents. Elementary teachers usually work with one group of pupils during the entire school day. Secondary teachers usually specialize in a particular subject area.

The job outlook in Alaska varies by specialty and location. Over six thousand are employed throughout the state. Wages range from $2,500 to $4,200 per month *[AKCIS, 1989]*. Suggested courses include advanced math, biology, physical science, oral and written communications, psychology, sociology, history, typing, general shop/mechanics and computer applications. Alaska training sites include Alaska Pacific University, Sheldon Jackson College, U of AK-Anchorage, U of AK-Fairbanks and U of AK-Southeast. Related occupations include university and college teachers, education program specialists, vocational education teachers, child care workers, and special education teachers.

A college degree in education and an Alaska teaching certificate are required for most positions.

Education Personnel prepare and disseminate a broad range of marine education materials to students, teachers, and the general public. They may also instruct in environmental and marine-related problems. Education personnel fulfill the essential needs to create marine awareness and provide the insight necessary for long-range decision making on matters of global conservation.

Teachers Aides provide classroom and clerical assistance to elementary and secondary teachers. Duties vary. They may type, file, and copy information for the teacher. They also may supervise study halls, cafeterias, hallways, and playgrounds. Some actually teach, assist with lesson plans, and grade homework and quizzes.

Activities:

1. Ask a teacher in your school (not your own teacher) who really enjoys Sea/River Week to come into the classroom and discuss his or her job. Prepare some questions beforehand. Ask him/her to tell you how they got to be a teacher and what they like and don't like about teaching. Ask him or her some questions about Sea Week, especially what he or she likes best about teaching natural history. From your information, make a "Profile of a Teacher" poster. You might put a picture of that teacher at the center of your profile.

2. Bring in a ball cap with the word "Teacher" printed in bold along the bill. For a particular Sea Week/River week lesson, have selected students put on the ball cap and be the teacher. This lesson could be indoors or out. Help the "teachers" prepare for their lesson beforehand. "Teachers" might involve themselves in other phases of teaching like collecting papers when completed and evaluating the papers. If there is not enough time or enough lessons for all the students to serve as "teacher," choose those who do by a class vote, or by dividing into groups with each group choosing by vote.

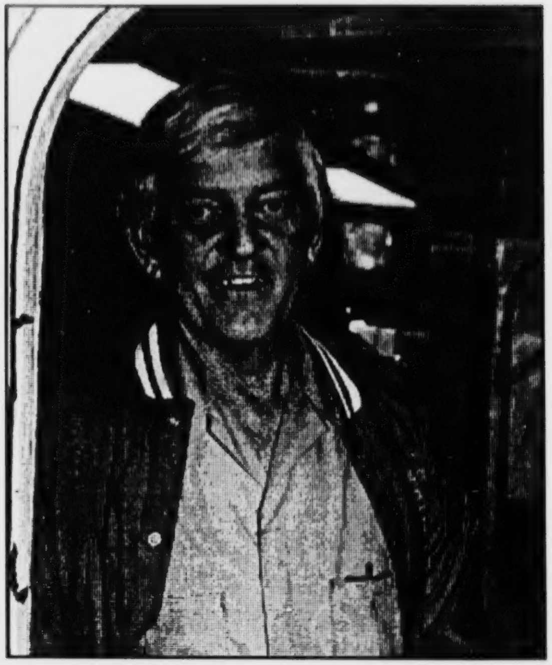
3. Ask students if they were teachers what kinds of things they would show their students during Sea Week. Then have students close their eyes and imagine themselves as grownups. They have a job as a teacher and they're doing a Sea Week activity with their students. When their eyes are open, their assignment is to tell their brief story out loud. The story should begin with the words "My name is Mr. or Ms. (Students last name). I am a teacher. For Sea Week my students and I are going to........" Students should complete the story. When all students have told their stories out loud, have them draw a picture of themselves as a teacher doing whatever they said they would be doing with their students. Post the pictures on the wall.

Tug Boat Operators

My name is Keith Elliott. I'm a tug boat operator. Our tug, the *Hank Brusco,* usually tows fuel barges. We've towed barges all over Alaska: on the Yukon River, to Little Diomede, Wales, Shishmaref, Teller, and Pelican. We just brought a barge across the Gulf of Alaska from Valdez.

The Hank Brusco is 72 feet long. With 1200 horsepower we can tow a barge as large as 50 X 250 feet. The *tow line* is 1000 feet of 1 1/2-inch steel cable with *surge chain* at both ends. Surge chain is gigantic. Just the steel on one link of the surge chain is *2 1/2 inches in diameter.* That's as big around as your arm! The surge chain is so heavy that holds the tow line deep in the water. So, when we're in heavy seas the tow line doesn't go slack–it just slowly moves up and down, taking up slack and letting it out. That keeps the tow line from breaking. Out at sea I work 6 hours and then the first mate takes over for 6 hours. I've seen rough weather in my time, but I have to say, *there's nothing like the Aleutian Chain.* Some of the roughest seas in the world are found out of Unimak Pass out there. This tug is named for a man who lost his life at sea. We're extra careful. If seas are over 14 feet, we don't go. And I like 20 to 30 fathoms under us at all times. We don't want our tow chain hitting bottom. We pay attention to weather–broadcast every 6 hours by Peggy Dyson, U.S. Weather Service, Kodiak. I call the other tug operators and ask *Did you hear Peggy this morning?* They say *Yep. Peg says a storm is on the way.* We all help each other.

When people ask me about my job I say *you've got to have a job that you enjoy doing.* And that's how I feel about being a tug operator–I enjoy the job.



Level IV Glacial and Intertidal Ecology
Card 8

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Ship officers oversee the general welfare of the crew and vessel. They supervise the loading and unloading of cargo, cleaning and maintenance of the deck and hull, running and navigating the ship, and communications and logs. Marine engineers supervise the operation and repair of engines and other equipment. Pursers assist passengers, do payrolls, and process the paperwork necessary to enter and leave ports. Opportunity in this field is good to very good in Alaska with 140 employed. Wages range from $2,000-$4,500 per month *[AKCIS, 1989]*. Much of the training is on the job, though preparatory training includes completion of an approved training program at a community college or vocational/technical trade school. College may also contribute to employment in this field. Suggested background courses include advanced math, physical science, oral and written communications, psychology, sociology, general shop/mechanics, electronics/electricity, drafting and welding. Related professions include deckhands and recreation guides.

Ship's officers must have a Coast Guard license and technical skills. Ship officers need a good math background, knowledge of navigation, meteorology, cargo handling, tides, and currents. Engineers need a good math background, knowledge of propulsion systems, electricity, plumbing, metal shaping and assembly, and the ship structure. Training can come from experience at a lower-level job, community college, vocational school, or a 4-year academy.

First officers (first mates) are second-in-command to the captain. They assign duties to the crew and maintain order and discipline on board. In addition, they plan and oversee loading, unloading and storage of the ship's cargo. They also aid the captain in directing the ship in and out of ports.

Activities:

1. Invite someone who works in commercial shipping to class. You might invite a barge operator, tug captain or crew or even a ferry worker. Prepare some questions beforehand. Back in the classroom write about what you learned.

2. As a research project students should find out costs for sending various weights from your community to Seattle. Compare differing modes of transportation (e.g. air, surface). How do shipping times compare for the different types of shipping. Have students write about what they learned.

3. Students can create an authentic model of a tug towing a barge. This model could serve as part of a Sea Week/River week exhibit or as a traveling exhibit to explain jobs in tug and barge operations to younger students.

4. List the safety equipment which a tug or other barge operation should have on board while operating on Alaska's seas or rivers. List the equipment and identify how it is used. Resources: Alaska Marine Safety Education Assoc.(AMSEA), Box 2592, Sitka, AK 99835 (907) 747-3287 or Commander-OAN, USCG 17th District, Box 3-5000, Juneau, AK 99802-1217.

Interpretive Naturalists

My name is Poppy Benson. I'm an interpretive naturalist for the U.S. Fish and Wildlife Service. I work at the Alaska Maritime National Wildlife Refuge. This refuge stretches from Cape Lisburne on the Chukchi Sea to the tip of the Aleutians and eastward to Forrester Island on the border of British Columbia! You'd have to be a bird to cover that much territory, and that's exactly what this refuge protects–millions of sea birds. This refuge has more sea birds than the rest of the continent combined–over forty million! Additionally, the refuge is home to thousands of sea lions, seals, walrus and sea otters.

I conduct school programs, talks for visitors and special programs for community groups. I give walks, show slides and lead bird watching trips. My job is to inform the public of the wonders of Alaska's coasts, especially this refuge. It's important that naturalists are friendly and outgoing, as well as knowledgeable. They have to be able to talk to people. But there is something that a lot of people don't know. I'm also a federal police officer. So, if somebody litters on the refuge or illegally harms fish or wildlife, I can give them a ticket. I don't like to give tickets, but I won't hesitate if people harm wildlife.

Since I tell people about the refuge, I have to study it myself. With more than 2,400 islands, headlands, rocks, islets, spires and reefs, it would take more than a lifetime to know everything about this place. I read as much as I can, especially fish and wildlife biologist reports. That way I know what the scientists are thinking and the information I give to the public is up-to-date.

Visitors are *so excited*. They get *me* excited. I love to travel, so I'm right at home with people on vacation. And, as I always say–visitors have a lot to teach me too. That's why I like them so much.

Level V Birds and Wetlands of Alaska

Card 1

U.S. Fish and Wildlife Service personnel are responsible for the conservation of the nation's wild birds, mammals, and fish for the enjoyment of all people. They coordinate with public agencies and private groups to achieve this end. The U.S. Fish and Wildlife Service is caretaker of over 400 National Wildlife Refuges across the country. The agency hires several interpretive naturalists in Alaska as well as others in information services. Wages range from $1,600 to $3,600 per month.

Good background courses include natural sciences, art, drama, basic math, physical science, oral communications, psychology and sociology. Though some of the job descriptions may require only a high school education, most interpreters have at least a B.S. or B.A. Interpreters usually have degrees in outdoor recreation, wildlife, forestry, biology, botany or communications. No Alaska postsecondary school has a program leading specifically to work in this field. Related occupations include park rangers and recreation guides.

Employers prefer neat, polite, articulate, outgoing and enthusiastic interpreters. Interpretive naturalists usually have a background in the natural or physical sciences and/or communications. They must have a good driving record for positions that require driving. Entry-level jobs usually require a college degree, though local experience or knowledge may substitute for education. Prior work experience meeting and assisting the public is useful.

Activities:

1. Visit a national wildlife refuge office nearby or invite someone from the U.S. Fish and Wildlife Service to the classroom. Prepare some questions beforehand. Back in the classroom, write a paragraph about what you learned. Information can be obtained from Public Information, U.S. Fish and Wildlife Service, 1011 E. Tudor, Anchorage, AK 99503 (Telephone: 907-786-3542) or from Alaska Wildlife Week, P.O. Box 20, Douglas, AK 99824 (Telephone: 465-4265).

2. Draw a large color facsimile of the U.S. Fish and Wildlife Service logo. Find out the mission(s) of the U.S. Fish and Wildlife Service, the locations of the fish and wildlife refuges in Alaska, and create a display in your school about the USFWS.

3. Make bird silhouettes on transparencies for use on an overhead projector. Students can then practice identification and data keeping–noting how many times particular species are shown. Then, transfer that experience to one in the field: students should locate themselves by twos in one spot, quietly waiting over a 15 to 30 minute period to count sightings of local bird varieties.

4. Listen to recordings of bird calls. See if students can duplicate particular bird calls. Offer a cutout, picture or other prize to the best caller for each bird. Note coloration differences between males and females of each bird species. Reproduce those differences in coloration in an art project using a sandpaper/crayon technique. Discuss the ways tour guides spot birds with clients.

5. Complete a beach, riverbank or lakeshore bird census using a field guide. Return to the classroom and graph the results. Brainstorm methods U.S. Fish and Wildlife personnel use to census birds in refuges.

6. Students learn about a bird or animal and then prepare a short talk to the class telling them what they found most interesting about the bird or animal. They find pictures (or draw their own) of the bird or animal in magazines or books and share them as part of their talk.

Wildlife Special Agents

My name is Jim Sheridan. I'm a special agent for the U.S. Fish and Wildlife Service. That means I'm a police officer for wildlife. I went to the Federal Law Enforcement Training Center (FLETC), which is a federal police academy. Every year I attend 40 hours of school to brush up on law enforcement and I have to pass a target test with a pistol. I have all the training of any other police officer, except I protect wildlife.

How do I do that? Well, special agents keep a close eye on animals and animal parts coming into and leaving the state. Congress made it against the law to transport protected and illegally-obtained wildlife across state lines. That law is called the *Lacey Act*. So, some special agents spot check airport baggage. We also patrol in the field. Since Alaska is so big and the wildlife refuges are so remote, about half of our agents use small planes for patrols. Sometimes agents conduct a *stakeout*. A stakeout is when they stay hidden and wait in a certain area where they think laws are being broken. It's hard catching law-breakers in the act.

Sometimes I work *undercover*. Undercover means I act like I'm a hunter just like everyone else. That way I see to it that hunters or hunting guides are obeying the laws. Sometimes my job is dangerous. One time I was in a skiff by myself at night in the middle of a huge lake. I didn't know which way to go or if I was driving in circles. Luckily I finally saw a light, one little pinpoint, that led me to shore. Special agents have to be prepared for a lot of things– for unexpected trouble, or for wilderness survival.

Special agents also do lots of paperwork. I work on budgets, order supplies and review permits. True, the job is exciting but also pretty regular, too.

I've always had a feeling for wildlife. Nearly all the special agents do. Lots of people would like to be special agents like me. I think that's because a lot of people want to do what I do–protect wildlife.

Level V Birds and Wetlands of Alaska

Card 2

U.S. Fish and Wildlife Service special agents are law enforcement agents responsible for 1) wildlife or wildlife parts coming into and leaving the country, 2) wildlife or wildlife parts transported across state lines, 3) wildlife of special importance, 4) migratory birds and 5) other designated wildlife such as marine mammals.

Opportunities with the U.S. Fish and Wildlife Service is limited. Special agents in Alaska can expect to earn $1,600-$5,100 per month *[AKCIS, 1989]* plus the federal Cost of Living Allowance (COLA). Special agents go to Federal Law Enforcement Training Center (FLETC) and though college is not required, over 75% of the agents today have college degrees or post-graduate degrees. Degrees in the natural sciences or law enforcement are preferred.

Courses a student would take in school include advanced math, physical science, biology, chemistry, sociology, psychology, general shop/mechanics and physical education. Though Alaska's colleges and universities offer courses which can lead to the job of special agent, none specifically offers a course of study specifically directed to this work. Law enforcement training and an interest in wildlife are crucial. Related jobs include law enforcement officers and park rangers.

Law enforcement officers maintain public safety by providing law enforcement and emergency aid. Investigate complaints and crimes. They apprehend and arrest violators and assist in their prosecution. They provide a variety of community services and peace-keeping functions such as handling traffic accidents, resolving family disputes, and giving directions. Most officers work on patrol or traffic duty.

The following Alaska training sites offer studies in law enforcement:

Department of Public Safety Training Academy–Sitka
Fort Wainwright Army Education Center-Fairbanks
Eielson Air Force Base-Fairbanks
UAS, Sitka Campus

Elmendorf Air Force Base Education Center–Anchorage
University of Alaska-Anchorage

Fort Greely Education Center–Delta Junction
University of Alaska-Fairbanks

Fort Richardson Army Education Center–Anchorage
Wayland Baptist University-Anchorage

Related occupations include health and safety inspectors, village public safety officers, correctional officers and jailers and fish and wildlife protection officers

Activities:

1. Invite someone who enforces fish and game laws to the classroom to talk about game regulations. Prepare some questions beforehand. Afterwards, ask students to write down what they learned about fish and game regulations in their area.

2. Draw a large color facsimile of the U.S. Fish and Wildlife Service logo. Find out the mission(s) of the U.S. Fish and Wildlife Service, the locations of the fish and wildlife refuges in Alaska, and create a display in your school about the USFWS. Include pictures of fish and game found in the various refuges. Information can be obtained from Public Information, U.S. Fish and Wildlife Service, 1011 E. Tudor, Anchorage, AK 99503 (Telephone: 907-786-3542).

3. Initiate a class discussion about hunting and fishing ethics. Should you obey fish and game laws even if nobody knows? How about wasting fish and wildlife resources–is that right or wrong? Ask students to relate stories they know about fishing and hunting. Ask them to write the stories down and create a class anthology concerning hunting and fishing ethics. Role play situations where students must make real-life moral decisions.

Animal Caretakers

My name is Jerry Deppa. I'm president of the Alaska Raptor Rehabilitation Center in Sitka. We take care of eagles, hawks, owls and other raptors who are injured. Raptors are birds of prey. Raptors hunt other animals. The center is like a hospital for raptors. Right now we have 14 bald eagles, two young goshawks and one western screech owl in the center.

I used to be a wildlife biologist. Others who work here all have other jobs. Some of them work as EMTs, doctors or nurses. Still others work in stores, offices or at the pulp mill—all kinds of jobs. Our veterinarian kindly donates his time. It's wonderful how people help to save the eagles–and other raptors.

But on the other hand, it's awful to see what people can do. Some of our eagles have been shot; others have been caught in traps; still others have been shocked on electrical wires or strangled by swallowed fish hooks. Eighty percent of the birds' injuries are human-caused.

We mostly feed fish to our raptors. Our goal is to get these birds healthy so they can be free again. Sometimes the veterinarian sets a broken wing. Sometimes one of the workers bathes an oiled eagle. Sometimes I take the hawk out to a guy wire we designed–for a practice flight. It takes time to get the birds healthy again.

One of our best days was last week when we let an eagle go. From all over Sitka people gathered at the beach. When we let the bird go, the eagle waited a moment, almost unbelieving, then flew up to a branch. He looked down at us for several minutes, then took off. He flew out to sea, then turned, and flew right by us twice, as if to say "thanks" and then was off. That made me happy. Everybody clapped.

Level V Birds and Wetlands of Alaska
Card 3

Animal caretakers are responsible for the welfare of animals in zoos, animal hospitals, aquariums, laboratories, and pet shops. They feed, water, bathe, groom, and exercise animals. They also may treat minor injuries and ailments, repair equipment and cages, and clean animal quarters. Veterinary assistants give emergency first aid, collect specimens, take X-rays, and do laboratory analyses. For animal caretakers a love of animals is a must, as well as patience and stamina. Training requirements vary widely. On-the-job training is sufficient for some; technical training for others.

Opportunity is fair in Alaska; 50 employed. Wages range from $800-$1,400 per month *[AKCIS, 1989]*. A high school diploma or GED is required, and/or an associate degree. Suggested training involves completion of an approved training program at a community college or vocational/technical/trade school. Good background courses include advanced math, chemistry, physics, biology, oral and written communications, health education, agriculture and computer applications. No Alaska postsecondary school has a program leading specifically to work in this field.

Related occupations include zoologists, veterinarians and their assistants, forest rangers, zoo and circus animal caretakers, and pet shop and farm workers. Most employers prefer people with a high school diploma and knowledge of animal care. Veterinarians prefer those with a 2-year animal technician degree for jobs as veterinarian assistant.

Activities:

1. Contact bird and animal recovery centers (such as the Raptor Rehabilitation Center, P.O. Box 2984, Sitka, AK 99835; phone: 747-8662). Students should make a report about what they discover.

2. Write a brief story (opinion, adventure) from the point of view of an endangered species. Discuss how animal caretakers help animals in danger of extinction.

3. Write up a plan for what to do with an injured bird.

4. Visit a national wildlife refuge office, invite U.S. Fish and Wildlife Service (USFWS) personnel to your class, or write the USFWS–1011 E. Tudor, Anchorage, AK 99503; phone: 907-786-3542. Find out about raptors in Alaska, special laws protecting them and what to do when an injured raptor is found.

5. Raise a pet finch or other bird in your class. Make scientific observations about the bird such as behavior at a set time during the day, amount and weight of food consumed, songs and recurrence etc. Chart your observations. How would your observations approximate those of the zoologist?

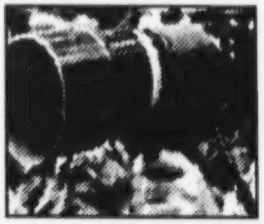
6. Borrow stuffed birds from state or federal agencies, museums, or a local taxidermist. If you can't obtain stuffed specimens, use pictures. Make a display in the classroom, making it as realistic as possible. Invite a fish and wildlife technician, a wildlife biologist, a hunter or someone else who knows birds well to class to tell something about the birds. Or, have different students read about the birds from fieldbooks. Then, each student picks a bird and writes a fictional story about an injured bird, how it got injured and what happens next. Post the stories on the wall.

Nature Photographers

My name is Bob Armstrong. I'm a nature photographer and writer. Maybe you've seen my book Birds of Alaska. That book took five years to finish! I used to be a fisheries biologist for the Alaska Department of Fish and Game. My specialty was dolly varden. I also used to enjoy hunting. But the kind of hunting I always liked best was with a camera.

Taking pictures and writing about animals is different from scientific study. To take good pictures, you have to watch animals very, very closely. By watching animals closely, I've learned a great deal. One time I was stalking dall sheep in Denali National Park. I was tired of trying to get close, so I picked where I thought they would go next and sat there. I sat there awhile. I still sat there even longer. Pretty soon, a whole herd of sheep was all around me! What pictures I got! I learned how important it is to let animals get used to you. If a person can write as well as take pictures, it helps in this business. To finish a book or article, I usually spend quite a bit of time in the library. Lately I've been very interested in high-speed photography. I'm taking pictures of insects in flight. To get a good photo I might plan it out for a week. I have a special trigger which takes the picture automatically when the insect comes near. For birds, I have a remote-control trigger. When a bird I want to photograph comes into range, click! I hit the remote control!

I sell my photos to a lot of different places: to magazines, encyclopedias, calendar companies or advertising agencies. But most of my photos go to a *stock agency*. Stock agencies send my photos all over the world. You know what I like about being a nature photographer? It's challenging. I like capturing nature–on film.



Level V Birds and Wetlands of Alaska

Card 4

Photographers use cameras to record visual images of people, events, and products on film. They use lights, filters, various lenses, and other accessories to create desired effects. They may develop the film and prepare the prints for presentation. Photographers find that marine settings are among the most colorful and diverse on earth. Some photographers specialize in the field of underwater photography, taking both still and motion pictures.

Opportunity is limited in Alaska with 180 employed. Wages range from $1,000-$1,900 or more per month *[AKCIS, 1989]*. Much of the training is on-the-job. Suggested training includes completion of an approved training program at a community college or vocational/technical trade school. College studies in photography will also benefit the applicant.

Good background courses include basic math, physical science, chemistry, written communications, psychology, art, drafting and graphic communications. Related occupations include graphic artists and designers, printing production workers and photofinishers.

Experience is important. A thorough background in the technical or esthetic aspects of photography can be acquired as a hobby, through class work, on-the-job training, or a formal apprenticeship. Many employers prefer some college background in chemistry and art, but not necessarily a formal program.

Activities:

1. Tell students they are now professional nature photographers and that they are now to guide us through a nature walk. Students should then cut out 7-10 pictures each from magazines relating directly to birds and/or wetland habitat. *Alaska Fish & Game* magazine is a great source for such photos. Students then write three to four sentences on a 3x5 card discussing each of the picture/photographs they've chosen. Glue the 3x5 card to the back of the pictures and laminate.

2. Invite a local wildlife photographer to the classroom to visit with his/her photos/slides or visit his/her studio. Prepare some questions beforehand. Be sure to ask him/her about their job. Think of something you saw in nature–this can be anything such as a sunset, a flower or an eagle capturing a fish. Write a step by step plan on how you would photograph what you saw.

3. Cut construction paper in the shape of cameras with a hole for the "lens." Students "take pictures" during a nature walk. When they return to the classroom, they draw the pictures they "took."

4. Bring in the bird picture book Birds of Alaska. Note the pictures taken and speculate on how the photographer managed to get the pictures. Write author/photographer Robert Armstrong (5870 Thane Rd., Juneau, AK 99801) with some questions about photographic technique. Be sure to include a self-addressed stamped envelope with your letter.

5. Open the back of a 35 mm camera and see how it works. Discuss terms and equipment related to photography such as *aperture, F-stop, shutter speed, shutter release, lens, film, depth of field, tripod, exposure, negative, light meter.* Obtain a 35mm camera and, as a class, shoot a roll of film outdoors with each student shooting one exposure of something different. Keep careful record of who shot each picture and compare the results. Who obtained the best exposures and why? Post the "Nature Photographers' results on the wall.

Wildlife Biologists

My name is Jack Lentfer. I am a wildlife biologist. I work with wild animals. Wild animals, like people, need food, water, shelter, and a place for young to be born and grow up. Wild animals also need to be protected from activities of people that would cause their populations to become smaller. My job is to make sure that places where animals live have food, water and shelter and that activities such as logging and oil development do not harm too many animals and their habitat.

Alaska has many kinds of wild animals. I worked with polar bears for many years. Our research helped wildlife managers decide how many bears could be hunted and how to protect polar bear habitat from effects of oil development. Polar bears live in five countries - Canada, Greenland, Norway (Spitsbergen), U.S.S.R, and U.S.A. Most of the time they live on sea ice. They are carnivorous, or meat eaters, and their main food is seals. To study bears we immobilized them by shooting a drug into them from a helicopter. We put numbered tags in their ears and released them. We than caught them again in future years to find out how and where they had traveled.

I also studied caribou. We learned how many caribou there were and how many were born each spring. From this we knew how many animals could be hunted. We also learned what areas were important to caribou for feeding in winter and for having calves. Other animals I have worked with are brown bears, deer, mountain goats, and marine mammals. I am also on boards that decide on protective measures for wildlife and how wildlife can be hunted.

A person wishing to become a wildlife biologist should plan to go to college and take courses in science. He or she should develop analytical, writing, speaking, and computer skills and have the ability to work in the out-of-doors and make good observations. Many wildlife jobs after college are with government agencies.

Level V Birds and Wetlands of Alaska
Card 5

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Biologists study living organisms, including their origin, identification and classification, structure, physiology, diseases, behavior and food habits, distribution, movements, reproductive biology, population dynamics, and population limiting factors. Most of the biologists in Alaska are employed as fisheries, wildlife or habitat biologists.

Opportunity is limited in Alaska, although 830 are employed. Wages range from $1,700-$3,300 per month *[AKCIS, 1989]*. College and/or graduate studies are required for biologist jobs.

Good background courses include advanced math, biology, physics, chemistry, oral and written communications, sociology and computer applications. Suggested Alaska training sites include the University of Alaska-Anchorage, University of Alaska-Fairbanks and University of Alaska-Southeast. Related occupations include university and college teachers, plant scientists and resource scientists in other disciplines.

A bachelor's degree is adequate preparation for some beginning jobs; however, those interested in a career in this field should plan to obtain an advanced degree due to intense competition for most biological jobs. A doctoral degree generally is required for college teaching and independent research.

Activities:

1. Invite a biologist to class or visit him/her at their job. Prepare some questions beforehand. Be sure to ask him/her about their job, their duties and how they got the job. Back at the classroom or after the biologist leaves, discuss what you learned and summarize the major points on the blackboard. Write a story as if students were the biologist. (For resources, contact Alaska Wildlife Week, P.O. Box 20, Douglas, AK 99824.)

2. Identify several types of animals which live in your area. For each, identify their habitat, where it lives, what covers its body, the number of limbs it has, how it eats, how it breathes, whether or not it has a big or little brain, how it reproduces and how it gives birth. In groups draw a picture of each animal on a chart along with the information. Tack the posters on the wall. Discuss how biologists gain information about animals.

3. Habitat is basic to all living things. Read a short story (or watch a video or filmstrip) on any kind of animal, preferably an Alaskan animal. Then, as a group answer the question *what is habitat?* as it pertains to your animal, using semantic mapping (bubbling) with the responses on the board. Discuss how biologists assess habitat. Have kids list discuss different ways people interact with different animals. Include different uses of animals, e.g. hunting in its various forms (subsistence, recreational, trophy), viewing, photography, trapping, guiding.

4. Have kids name as many animals as they can identify in their local area or in another area of Alaska. Write each animal's name with a felt marker on a 3 X 5 card. Tape the cards on the blackboard. Then, group the animals in several ways. First group them by habitat. Secondly, group them by size. Third, group them by color. Discuss the difficulty in finding a classification system that everyone agrees upon. Identify methods of scientific classification. Brainstorm the value of a system of classification to biologists. Then, phone or write a biologist to find out if you were right.

5. Create poster board displays featuring local habitats, such as wetland, pond, forest, etc. Students may draw features of the habitat or attach leaves or other debris to the poster to make the habitat more real. Then, each student draws a picture of his/her favorite animal (several with the same animal is okay). Make the drawings big enough that they can be cut out and pasted in the habitat. Students can write a story about their animal and a typical day in their lives.

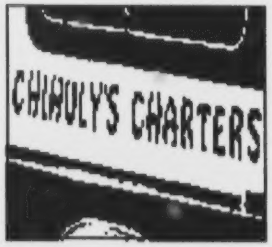
Sportsfishing Guides

My name is Mike Chihuly. I'm a sportsfishing guide at Deep Creek, near the village of Ninilchik, on Cook Inlet. I take up to four people out on 6 to 8-hour trips for king salmon and halibut. To take clients out on the skiffs, I needed a *six-pack license*, issued by the U.S. Coast Guard. A six-pack license lets me operate small boats for hire. To get your six-pack, you have to document your time on a boat and pass physical and written exams. The written exam is pretty hard, so it pays to study.

CHIHULY'S CHARTERS

I like guiding–I like to see others enjoy themselves. It took awhile to build up my *clientele*, but now I get a number of people who fish with me year after year. My favorite clients, though, are always the first timers. It's a real adventure for them. I always remind myself that this might be their only fishing trip of the year–it might be the only fishing trip of their life! I do my best to make it great. This is a family business. My brother and sister also guide. My wife takes reservations. We pack fresh cookies, muffins and hot coffee on every trip. Sometimes clients ask me to tell them stories of exciting fishing trips. One time a fish fought so hard it took nearly all the line off the reel. Then the reel jammed, but the line held. We frantically followed the fish around in the skiff. When the line slacked, we cut it and then quickly threaded onto another rod and reel that had no line of its own. My client then landed an 85 lb. king! Another time a client set down his rod just as a king hit the bait. Wham! the rod went overboard. Not wanting to give up, I dragged a large halibut hook across the bottom and luckily snagged the pole. We brought it up and the client brought in the fish!

Before I was a sportsfishing guide I was a habitat biologist and a commercial fisher. Now I'm on the Board of Fisheries, so I help make decisions about Alaska's fisheries. We help make regulations. That's a big responsibility. Keeping regulations simple is important. But one thing I've learned in the fisheries business–conservation comes first.



Level V Birds and Wetlands of Alaska
Card 6

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Recreation guides organize and conduct hunting, fishing, hiking, float, or similar trips for adventurers and tourists in scenic and wilderness areas. They demonstrate equipment and techniques. They also explain rules and regulations. One of their primary duties is to observe clients to ensure their safety. Opportunities are good in Alaska; 638 employed. Wages range from $90-$130 per day (per actual day worked) or higher if you own the business. Training is usually on-the-job. Good background courses include basic math, physical science, biology, oral communications, psychology, home economics, physical education and general shop/mechanics.

Related occupations include recreation directors and supervisors, recreation leaders and tour guides.

The majority of the recreation guides begin as helpers and advance with on-the job experience. They need a general knowledge of the outdoors and specific skills relative to the type of fishing, outfitting or guiding service provided. Hunting and fishing guides must be licensed. Sportsfish guiding, both fresh and salt water, holds great potential in numerous areas around the state.

Recreation leaders organize, teach, and conduct recreational activities for adults and children. They demonstrate equipment and techniques, explain rules, and supervise to enhance safety, enjoyment, and skill. Opportunity is very good in Alaska; 785 are employed. Wages range from $900-$1,700 per month *[AKCIS, 1989]*.

Suggested training includes completion of an approved training program at a community college or vocational/technical trade school and/or college. Good background courses include advanced math, biology, oral and written communications, psychology, sociology, art and physical education.

Activities:

1. Invite a sportsfishing guide to class or visit one at their job. Prepare some questions beforehand. Be sure to ask him or her about their job. Back at the classroom write and illustrate brief stories about work as a sportsfishing guide.

2. Write down the items you would need to take clients on a sportsfishing trip, including fishing tackle, bait, foodstuffs, etc. As a class, take a fishing trip to a local lake, stream, wharf or other fishing area. Back in the classroom brainstorm ways such fishing jaunts could be expanded into a fish guiding business.

3. Write some math story problems using fish guiding as a theme. Obtain amounts clients pay, weights of fish caught, gallons of fuel used figures from a local sportsfishing guide or make up your own figures. Make the story problems funny and interesting!

4. Brainstorm the kinds of skills you would have to have to be a sportsfishing guide. Write those skills on the board. Then, assess class members to see who has those skills, or, if no one has them, brainstorm how you can attain them. Include information about sportsfish and wildlife encountered by sportsfish guides in your area. Identify fish life cycles, run timing and foods eaten. Also gather as much local information you can about tides, weather, currents, bottom structures and harbor facilities. Create a classroom book, "Guide to Sportsfish Guiding" or make up your own title.

Big Game Guides

My name is Ron Smith. I'm a big game guide. I take clients bear hunting. We hunt in Southeast Alaska. We hunt on the beaches and wetlands, along the streams, and in the mountains. We're never far from the sea. Brown bears depend on beach grass in the spring and the salmon runs in the fall. Brown bears need wetlands.

Ever since I was a kid I wanted to be a hunting guide. I have always loved outdoor activities, especially hunting. I used to work as assistant guide with the famous bear hunter Karl Lane. Karl was a legend. I worked with Karl for three years. Then with letters of recommendation and by passing a written and oral test I became a registered guide on my own. After ten years as a registered guide, I can apply to be a master guide like Karl.

Hunting clients come from all over. Many are Americans; others are Germans and Austrians. I plan everything for their hunt: the food, the area in which they hunt, the permits they'll need. I arrange everything but the weather. Nobody can schedule that. Our hunts are in the spring and fall. Spring season begins at the end of April and ends May 20. The fall season begins September 15 and goes until Christmas. Sometimes we track a big brown bear for days. When we finally get within range, the client carefully stalks closer and kills the bear. I stand by with a rifle just in case.

Getting a big bear out of the field is hard work. A wet bear skin with the skull can weigh well over 100 lbs.! The bears we take are all trophy mounted or made into bearskin rugs.

Karl always stressed that conservation comes first. So do I. If there weren't any brown bears, I wouldn't have clients. If I didn't have clients, I wouldn't have work. It's as simple as that.

Level V Birds and Wetlands of Alaska
Card 7

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Big Game guides organize and conduct hunting trips for hunters in scenic and wilderness areas. They assist the client in locating game demonstrate equipment and techniques. They also explain rules and regulations. One of their primary duties is to observe clients to ensure their safety. Opportunities are good in Alaska; 638 employed. Wages range from $90-$130 per day or higher if you own the business. Training is usually on-the-job. Good background courses include basic math, physical science, biology, oral communications, psychology, home economics, physical education and general shop/mechanics.

Related occupations include recreation directors and supervisors, recreation leaders and tour guides.

The majority of the recreation guides begin as helpers and advance with on-the job experience. They need a general knowledge of the outdoors and specific skills relative to the type of fishing, outfitting or guiding service provided. Hunting and fishing guides must be licensed. Sportsfish guiding, both fresh and salt water, holds great potential in numerous areas around the state.

Recreation leaders organize, teach, and conduct recreational activities for adults and children. They demonstrate equipment and techniques, explain rules, and supervise to enhance safety, enjoyment, and skill. Opportunity is very good in Alaska; 785 are employed. Wages range from $900-$1,700 per month *[AKCIS, 1989]*.

Suggested training includes completion of an approved training program at a community college or vocational/technical trade school and/or college. Good background courses include advanced math, biology, oral and written communications, psychology, sociology, art and physical education.

Activities:

1. Invite an assistant guide, registered guide or master guide to the classroom or pay one a visit. Prepare some questions beforehand.

2. Invite a fish and wildlife protection officer to class to discuss their experiences with big game guides.

3. Cut out ads from old Alaska magazines advertising hunting and guiding services. Make a collage from the advertisements into a poster. Display the poster in the school.

4. Each student makes their own poster advertising a big game guiding service. Display the posters in the school.

5. Write for information about big game guiding. (Resources: Alaska Dept. of Fish and Game, Box 3-2000, Juneau, AK 99802 or Alaska Professional Hunter's Assoc., 301 E. 77th, P.O. Box 91932, Anchorage, AK 99509.) Each student is assigned a portion of the materials received and gives a "show and tell" about what they discovered.

6. Research Alaskan big game animals' life histories, habitat, hunting methods, etc. Resources: Alaska Dept. of fish and Game, library, personal experiences of friends and relatives and self. Be particularly aware of the physical demands on the hunter and guide of different types of hunts.

Civil Engineers

My name is Norm Dornbrier. I am an engineer. I help build and design *aids to navigation* for the U.S. Coast Guard. The Coast Guard protects our coasts and waterways. Aids to navigation help people on the sea.

Out at sea boat captains need to know which way to go. The Coast Guard broadcasts powerful radio signals called *Loran* to help tell captains where they are. We mark rocks or reefs hidden under the sea with *buoys* and *lighthouses*. At the entrance of harbors we place huge orange triangles called *range markers* to tell a captain the safest way in. I help design and fix all of these.

When aids to navigation need repair, I take photographs and video pictures. Then I write a report. I try to decide how much it will cost to fix things. If I need to make a design, I use a computer. It's easy to design things on the computer. Plus, it's faster.

I get around a lot of ways on my job. Sometimes I ride in helicopters. Other times I go aboard boats called *buoy tenders*. One time I rode on a big Coast Guard airplane out to Attu Island. The plane was so big it could carry a truck.

Another time I had to check a Loran tower in Nome that is taller than the Empire State Building. I climbed on a narrow ladder, up, up, until I was above the clouds. From the tower I could see Diomede Island in the Soviet Union. I checked the lights on the tower and decided that the tower needed a new paint job. I made a report, and things got fixed.

The places I go are so wild and beautiful! I like to travel. But the most important part of my job is the mission of the Coast Guard. We save lives.

Level VI Fish and Fisheries
Card 1

AKCIS
ALASKA CAREER INFORMATION SYSTEM
alaska sea week

Civil engineers design and supervise construction of such structures as roads, airports, harbors, bridges, dams, pipelines, water and sewage systems, buildings, and subdivisions. Their duties include drawing up plans, making models, comparing costs of various methods, and ensuring the project complies with regulations. Civil engineers perform a variety of engineering work. Related to marine and coastal areas, they plan, design and oversee construction and maintenance work in and around specific harbor areas or projects. The civil engineer also supervises field survey parties and maintains an accurate and up-to-date set of topographical maps indicating the depth contour and other characteristics of the harbor area. They also prepare plans for required maintenance and construction projects and inspect these projects.

Opportunity is limited in this field with 1,120 employed in Alaska. Wages range from $2,300-$4,100 per month *[AKCIS, 1989]*. This job usually requires a college degree. Good background courses include advanced math, physics, chemistry, oral and written communications, physical education, drafting, general shop/mechanics and computer applications.

Suggested Alaska training sites include the Univ. of AK-Anchorage and Univ. of AK-Fairbanks. Related occupations include construction superintendents, mechanical engineers, electrical engineers, petroleum engineers and mining engineers. Employers prefer engineers with a degree and 2 to 5 years of experience. Some require a knowledge of computers. Upper-level positions in government or with firms that offer public services require a license.

Activities:

1. Invite an engineer to the classroom or visit one on the job. Prepare some questions beforehand. Be sure to ask the engineer about projects related to seas, coasts and rivers. Back in the classroom draw a picture of an engineer on the job. Give your engineer a name. Post the pictures on the wall in a display entitled "Civil Engineers of Alaska."

2. Make paper maché models or construction paper cutouts of a lighthouses and other aids to navigation. (Resources: *Lighthouses: Then and Now*, and other publications, Commander-OAN, USCG 17th District, Box 3-5000, Juneau, AK 99802-1217). Use your models as part of a Sea/River Week exhibit.

3. Invite a boat captain or other vessel operator to class. Ask him/her to explain "rules of the road" and other methods of safe boat operating. Ask him/her about the importance of aids to navigation in safe vessel operation. (Resources: U.S. Coast Guard Auxiliary, P.O. Box 3-5000, Juneau, AK 99801.

4. Draw a picture of a lighthouse or other aid to navigation on a computer. Discuss the way computers are used in *computer-assisted drafting (CAD)* and how computers might make life easier for civil engineers. (Resources: *CAD, Industrial Education*, OAVE, Dept. of Education, P.O. Box F, Juneau, AK 99811.)

Store Managers

My name is Steve Ayers. I manage two fishing supplies stores–one in Homer and one in Kenai. We sell marine hardware, industrial fishing equipment, trawls, seines, longline gear and safety survival gear. We also custom-build fishing nets. We can hang a complete purse seine as well as trawl nets.

We sell the latest in commercial fishing gear and electronics. I used to be a troller, and I've worked in the fishing supply business for 18 years now. Half the time commercial fishers walk in here and just ask us *"What do I need?"* We're problem solvers. In this business you have to keep up on the training yourself. I've taken the safety survival course at Alaska Vocational Technical Center. We've also got to know state regulations so we can tell commercial fishers what they have to have. When you're the store manager you have a variety of duties. I supervise the other employees, order things, collect the money, do the banking, maintain the equipment, drive the truck and ship and receive materials. But I don't do it all myself. When you work in a small store everybody does everything. But one thing is true for all of us: we've got to be outgoing and friendly to the customers.

When it comes to fishing safety, I'm a believer. I've seen too many commercial fishers try to save a few bucks by going without survival suits, or not paying attention to the expiration date on their life rafts. Too many have died. I've sold a lot of survival suits, and I can name at least six people whose lives have been saved by having them. Today there is all kinds of sophisticated safety equipment for commercial fishers. From flare guns to EPIRBs to *halon* firefighting equipment, safety at sea is number one.

Often commercial fishers come in here right off the boat. And I've learned that they're sharp business people. I like helping them out. They're always bringing me presents of fish and crab. We work together. Commercial fishers are honest and straight–the salt of the earth. That's why I like this business.

Level VI Fish and Fisheries

Card 2

Sales representatives use specialized knowledge to sell equipment and supplies to businesses and organizations. They usually travel to the customer's place of business. They display and demonstrate merchandise as well as quote prices. They prepare sales contracts.

Opportunity in Alaska is fair with 1,580 employed at a wage of $1,000-$2,700 or more per month *[AKCIS, 1989]*. Suggested training includes high school or GED and completion of an approved training program at a community college or vocational/technical/trade school. Good suggested background courses include basic math, physical science, oral and written communications and marketing and distribution. No Alaska training sites specialize in training leading specifically to this profession. Related occupations include business services salespeople, store salespeople and automobile salespeople.

Many employers prefer to promote employees already working within the firm. Other employers require previous sales experience and provide on-the-job training. Increasingly, employers are preferring college graduates with training in that field which corresponds to the nature of the product sold.

Store salespeople display and sell merchandise in retail and wholesale stores. They provide general information about the product and assist and advise the customer. They prepare sales slips or contracts. They receive payment or credit card. In small stores they may do the ordering, pricing, display work and inventory.

Activities:

1. Visit a fishing supply store. Prepare some questions beforehand, as well as a *wish list* of items students would select. Price the items and complete some math or business problems related to that equipment back in the classroom.

2. Practice net hanging and mending in the class. (Resources: "Gillnet Hanging" by Paula Cullenberg, Alaska Marine Advisory Bulletin #29, Univ. of AK Sea Grant College Program, UAF, Fairbanks, AK 99701 or "Making a Fish Net," Mildred Jacobsson, available from Nine Star Enterprises, Inc., 650 W. Intl. Airport Rd., Anchorage, AK 99518.)

3. Find out what an EPIRB is and how it works. (Any local commercial fishing supply store can tell you.) Ask a couple of students to volunteer to do the research and report back to the class. Maybe they can borrow one and bring it to class for a demonstration.

4. Survival suit races: Borrow a survival suit or a couple of them, go down to the nearest pond, lake, river or to the sea, and race between two points with survival suits on. Make sure you have a rescue rowboat and lifeguard(s) handy!

5. Draw a picture of fishing vessels, labeling and highlighting the safety equipment required. For information regarding fishing vessel safety contact Alaska Marine Safety Education Assoc. (AMSEA), Box 2592, Sitka, AK 99835 (907) 747-3287. Post your pictures on the wall in a display featuring fishing vessel safety.

Fish and Wildlife Technicians

My name is Kim Rudge. I'm a Fish and Wildlife Technician for the Alaska Department of Fish and Game. In Homer we measure, weigh, determine sex and pluck scales from commercially-caught salmon. That way fishery managers can decide the age of the fish caught. They can decide the *age-length ratio* of escapement fish stocks. An escapement is the fish which the commercial fishers haven't caught. They are the ones who swim upstream and lay eggs. From fish scales we determine the age of the fish by counting the rings in the scales, just like counting the rings on a tree. Also, by *digitizing* the scales we can determine the river the fish is going to run into. Digitizing involves measuring the distance between the growth rings in the scale.

This may sound funny, but I love chasing after *data*. Data is just information. I just love gathering information. I work on the Kenai Peninsula from June to August. But in the spring I'm a data collector too. Then, I assist in managing the herring fishery in Kodiak. I pack up a tent, cook stove, a radio for communications with the office, a red rubber boat and and outboard and I'm gone–to a remote bay way out on Kodiak Island. When the commercial fishers start catching herring, I go around, ask for scale samples and find out how many fish they caught. In the fall I count fish at a *weir* on Kodiak Island. A weir is like a picket fence across the river. Some places have *sonar counters* but we use a method of one fish, one click on the counter when we open the gate. Know what I do on my days off? I beach comb! One time a TV even washed up, but let me tell you, after floating in the ocean we didn't exactly watch MTV on it! All the garbage on the beaches makes me sad. But the animals I see when I hike always make up for it. My favorites are the squirrels and foxes.

I've done this job for 9 years and I love it. That's because I work outside and I'm always doing and discovering something different. What more could I ask for?

Level VI Fish and Fisheries
Card 3

Fish and wildlife technicians perform technical tasks in the study, management and protection of fish and wildlife. They collect and record data on the distribution and number of fish and wildlife including egg counts, weight/length measurements, tagging, and aerial surveys. They may work in a laboratory or at a remote field site.

Opportunity is limited in Alaska with 180 employed. *[AKCIS, 1989]* Wages range from $1,500-$2,500 per month Suggested training includes completion of an approved training program at a community college or vocational/technical trade school and/or an associate degree. Good background courses include advanced math, biology, physics, physical science, chemistry, written communications and forestry.

Suggested Alaska training sites include the Univ. of AK, Kodiak College, Kotzebue Technical Center, Prince William Sound Community College, Sheldon Jackson College, Univ. of AK-Fairbanks and Univ. of AK-Southeast. Related occupations include forestry technicians, biologists and aquacultue workers.

The intense competition for most openings results in most successful applicants having at least a 2-year degree in fisheries or wildlife technology or comparable experience.

Biologists study living organisms, including their origin, identification and classification, structure, physiology, diseases, and behavior. Most of the biologists in Alaska are employed as fisheries, wildlife or habitat biologists.

Opportunity is limited in Alaska, although 830 are employed. *[AKCIS, 1989]* Wages range from $2,000-$3,300 per month. College degree and/or graduate studies are required for biologist jobs.

Activities:

1. Invite a fish and game technician to your class or visit one on the job. Prepare some questions beforehand. Later, write about what you learned.

2. Gather as much information about a particular wildlife phenomenon in your area as you can. If it is a beaver dam, measure it. Check the depth of water behind the dam. Note the location of the beaver lodge. Compare with another beaver dam. If the phenomenon is a fish run, count the number of fish in a given area. Compare with similar runs in other streams. Discuss the kinds of information a fish and game technician might gather and how the information is used.

3. Construct a model of a fish weir. Brainstorm the kinds of information that fish and game technicians can gather at a weir site.

4. Take length, weight, sex and scale samples from salmon (or obtain copies of such information from the nearest ADF&G office). Write math story problems using this information and test the problems on another class.

5. Write a story as if you were a fish and game technician, involving both your duties as a data collector and your lifestyle at a remote camp. What equipment would you take? What wildlife would you expect to encounter? Decide if you would like or dislike work as a fish and wildlife technician.

Aquaculture Workers

I'm John Ennor. I manage a salmon hatchery near Juneau. A salmon hatchery is a place where salmon eggs are raised. Hatcheries are built on streams by the sea. After the salmon eggs hatch, the *salmon fry* swim into ponds. Salmon fry are baby salmon. They stay in the pond until they're ready to go to *fish pens* in the ocean. Fish pens are like floating cages. We feed the fish in the fish pens and when they're big, we let them go.

After the salmon have grown up they come back to the stream to lay their eggs and die. When salmon are trying to lay eggs they struggle to swim upstream. They swim into ponds and up special metal chutes right to the hatchery. We net them, kill them, then open them up and harvest the eggs. The fish go to a fish processor and the eggs are put into trays. Clear water runs through the trays. Those eggs hatch into salmon fry and more salmon are born.

Millions of fish can come from our hatchery. Last year we gathered 31 million eggs! Lots of fry don't grow up to be adults, though, because other fish eat them. But lots do make it. And when they come back, a seine boat catches some of them in front of the hatchery and we sell them. With that money we're able to keep the hatchery running. We only catch some of the salmon, though. Commercial and sports fishers catch others, and we take others for fish eggs.

I like my job. I like being outside, and I like working with fish. People are eating more fish nowadays. Hatcheries make more fish and more jobs. That makes something for everybody.

Level VI Fish and Fisheries
Card 4

Aquaculture workers assist fishery biologists in the protection and enhancement of fish stock. Hatchery workers strip eggs and milt from brood fish, fertilize and care for eggs, feed young fish, clean ponds, and maintain hatchery grounds and equipment. Field workers gather eggs, remove stream blockages, build fish weirs and ladders, fertilize lakes, and gather data on natural fish populations.

Opportunity in the aquaculture industry in Alaska is limited with 75 employed. Wages range from $1,600-$2,000 per month *[AKCIS, 1989]*. Suggested training includes completion of an approved training program at a community college or vocational/technical trade school. Suggested training includes an associate degree. Useful background courses in school include advanced math, biology, chemistry, physics, oral and written communications and agriculture. Alaskan training sites include: University of Alaska, Kodiak College, Kotzebue Technical Center, Prince William Sound Community College, Sheldon Jackson College, University of Alaska-Fairbanks and University of Alaska-Southeast. Related professions include fish and wildlife technicians, forestry technicians and biologists. Most employers prefer applicants with work experience in fisheries biology or a related field. Competition for fisheries biology jobs is intense and highly trained individuals often apply for aquaculture positions. Construction, machinery operation and maintenance, outdoor living and fishing skills are helpful in this profession.

Aquaculturists research, design, and implement methods used in the production of marine plants and animals in modified environments.

Activities:

1. Visit a hatchery. Interview hatchery workers. Back in the classroom, draw a picture of a hatchery worker at work. Below the picture identify what the hatchery worker is doing (the teacher may help with this part). Post your picture on the wall.

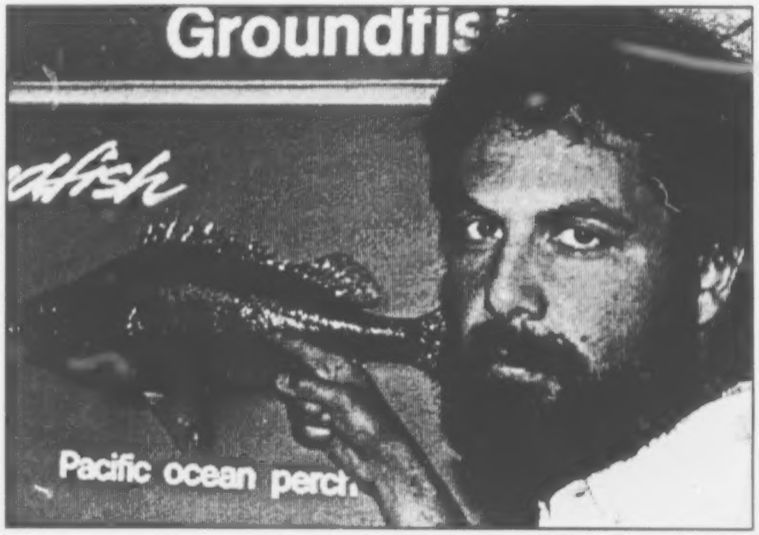
2. Dictate a story of the appearance, feeding habits, behavior and care of fish in a hatchery at different stages of their life cycles.

3. Take a slime sample from a salmon or other fish and look at it under the microscope. Also look at a scale, eye and piece of gill. Brainstorm why someone in a fish hatchery might examine the same items. What would this person be looking for? Penned fish in hatcheries eat fish food in pellets. See if you can find out what pellet fish food is made of.

4. Make models or construction paper cutouts of an aquaculturist's tools in the classroom including a fish ladder, thermometer, dipnet, hatching trays, hipboots, antibiotics, fish knife and egg bucket. Construct a model of a fish hatchery using shoe boxes, drinking straws etc.

5. Demonstrate the life cycle of the hatchery salmon in a mobile. Hang your mobile from the classroom ceiling.

Biometricians



My name is Jon Heifetz. I am a biometrician for the National Marine Fisheries Service. Biometricians use math and statistics to study biological data. Statistics are numbers. It may seem strange that math and numbers are so important to a biologist, but they are. As a biometrician I use data obtained about fish to help make recommendations for catch quotas. Catch quotas are simply the number of fish commercial fishers are allowed to catch. So, numbers are important to biometricians, biologists, fisheries managers and commercial fishers–just about everybody.

A lot of my work is on a computer. Sometimes I write computer programs to fit the project I'm working on. Other times I use commercial spreadsheets and graphs. I also troubleshoot the computers. That means I help other scientists with their computer problems.

We use data that other scientists and I have collected to make reports to the North Pacific Fisheries Management Council and the International Halibut Commission about fish harvest levels. We try to predict what's going to happen with different types of fish. The fisheries management groups have to balance what is biologically good for the fishery with what is good for the commercial fishers.

But I'm not always at a computer. I go out in the field for 30 to 40 days every year. For example, I went to Prince William Sound to study the effects of oil on groundfish, crab, and shrimp. I also helped tag 10,000 sablefish in Chatham Strait to get an idea of how many fish are in that area. We also were looking at migration patterns. That means where the fish go. I like field work, but here's a secret: I sometimes get seasick! The life of a biometrician!

You know where I often go after work? Fly fishing! I guess you could say I like to fly by night. But seriously, as a biometrician what I do helps others make a living. I like that. My job helps provide fish for future generations. That's a good feeling.

Level VI Fish and Fisheries
Card 5

Biometricians use mathematics to interpret biological data. They utilize computers to compile and analyze information. They look for trends in biological data. The trends they discover are used in management decisions regarding fisheries, wildlife or habitat. A biometrician may be a biologist who specializes in math and computers or a math and computer specialist who specializes in biology.

Opportunity is limited in Alaska. Wages range from $1,700-$3,300 per month *[AKCIS: Biologists, 1989]*. College and/or graduate studies are required for biometrician jobs.

Good background courses include advanced math, biology, physics, chemistry, oral and written communications, sociology and computer applications. Suggested Alaska training sites include the University of Alaska-Anchorage, University of Alaska-Fairbanks and University of Alaska-Southeast. Related occupations include university and college teachers and plant scientists.

A bachelor's degree is adequate preparation for some beginning jobs; however, those interested in a career in this field should plan to obtain an advanced degree due to intense competition for most biological jobs. A doctoral degree generally is required for college teaching and independent research.

Activities:

1. Invite a fisheries biologist to the class or visit one on the job. Ask him or her about work as a biometrician. Prepare some questions beforehand.

2. Plug some of your own fisheries data into a computer spreadsheet. (You could ask a local seafood processor for data on fish processed or a certain commercial fisher about his/her catch over the past several years.) Create a graph showing trends regarding a species of fish. Post your graph on the wall along with your ideas about what caused the trends. Make some predictions about the future.

3. Write some math story problems about fish. For example, 80,000 coho salmon are expected this year. Typically about 5% of them have coded wire tags. How many coded wire tags should be collected?

4. Obtain samples of different salmon species from a fish hatchery, U.S. Forest Service etc. Devise your own methods of differentiating between the species. Develop a classification key, i.e. dorsal fin or not, spots on upper lobe (upper part of dorsal fin) etc. Obtain the poster *"Game Fishes of Alaska"* from AKDF&G, Box 3-2000, Juneau, AK 99802. Ask for other materials related to fish identification. Write a paragraph about how a biometrician makes predictions about certain fish species.

5. Disease identification activity: Obtain a 40x microscope. Contact ADF&G Pathology, FRED Division, 3333 Glacier Highway, P.O. Box 3-200, Juneau, AK 99802-2000 (907-465-3577) for sample slides of *trichodina* (a protozoa) and clean fish tissue slides. Also ask for sheet reprint *"Protozoal Diseases."* Review contaminated slides. Read and review the article and discuss possible ways of disease prevention and eradication in hatcheries. Brainstorm ways that a biometrician might use mathematical models to help diagnose, prevent and combat disease in fish.

Longliners

My name is Jake Phillips. I've been a longliner since 1946. Longliners fish just the way their name sounds: with long lines. My 43-foot boat is called the *Lea*. We fish out of Pelican.

Longlines are used to catch halibut and other fish on the ocean floor. We lower strong *groundline* with lines tied on with baits and hooks–*gangions*–into the sea. The groundline lays on the bottom. The halibut or black cod bite the hook and lay there until we reel the groundline in. Anchors hold the line on the bottom and a buoy and upright poles mark it on the surface. The last few years we've only gotten three one-day openings every year for halibut. My wife Nancy is my deckhand. We dress our fish right after they hit the deck, ice them and sell them in Pelican. Let me tell you we work our tails off every minute of that 24 hours! That's hard on me at my age. Plus, it's tough only getting to fish for halibut three days a year. Things aren't getting any easier for fishermen nowadays. But in my time I've seen many a *plug load* of halibut. Halibut is the finest eating fish there is, you bet. Generally for halibut we fish at about 100 fathoms. For black cod, it's 300 fathoms. Our black cod season is spring and fall (2 seasons). Most of our black cod goes to Japan. A couple of years back I was lucky enough to get to go to Japan. The black cod I saw there went into fish stews.

Things have changed in my years of longlining. The fishing gear has gotten better. The navigation gear has gotten a whole lot better. But there's a whole lot more fishermen. There's been a real explosion of numbers. They lay out so many longlines that I'm worried about our fishery.

The way I learned it, you don't waste fish. You always fish safely. And you think about the consumer–the person buying the fish. Longliners are self-sufficient. We're on our own. We take pride in what we accomplish.

Level VI Fish and Fisheries

Card 6

Longliners generally use gear called longlines which are made up of lengths called skates. Skates are long groundlines to which baited gangions, or leaders are attached. The longlines are set, then checked some time later for the halibut or other bottomfish that have been caught. In the Northeastern Pacific, the longline is the only legal means by which Canadians and Americans can take halibut. This rule is enforced by the International Halibut Commission. Longlines are marked with buoys and upright poles on either end. Longliner captains manage the operation of the vessel. Their work involves administrative and technical responsibilities for the operation, maintenance, and safety of the vessel; planning and supervision of operations and maintenance on the deck and engine of the vessel; administration of business affairs such as purchasing, disbursing, and insuring compliance with laws and regulations; and piloting vessels through inlets, straits, and harbors.

Deckhands do much of the deck work aboard vessels. They help casting away and tying up the vessel. They help operate hydraulic equipment, help bait and set longlines, and help in cleaning, icing, and unloading the fish. They may assist in steering and navigating the vessel. Hours can be long. During openings the work day may last 24 hours or more without a sizeable break. Wages can vary with years of experience. A $30 *[1989]* deckhand permit is required and deckhands usually supply their own rain gear. The work is seasonal. Physical strength is required on this job. The job can be dangerous. Aspiring deckhands should make sure prospective vessels carry proper safety equipment and that the skipper is a safe operator. Working up to vessel captain requires a sizeable capital outlay.

Activities:

1. Invite a longliner to the classroom or visit one at the docks. Prepare some questions beforehand. Back in the classroom students write about what they learned.

2. Contact your local Alaska Department of Fish and Game office. On a calendar mark off the halibut and other fish openings for areas around the state. Keep track of changes in fish openings as they occur.

3. Find out as much as you can about fish that longliners catch, especially halibut and black cod. Resources: Wildlife Notebook Series, also the poster *"Game Fishes of Alaska"* from Alaska Dept. of Fish and Game, Box 3-2000, Juneau, AK 99802.

4. Make a model of longline gear. Ask a longliner to help you or consult books such as Fisheries of the North Pacific, by Robert J. Browning, Alaska Northwest Books, Box 3007, Bothell, WA 98041-3007.

5. Find out the halibut openings for past years. When did the one-day openings begin? Why did the length of openings have to change? (Contact Commercial Fisheries Entry Commission, P.O. Box KB, Juneau, AK 99811 (Telephone: 586-3456).

Fish Tenders

My name is Paul Seaton. I'm captain of a fish tender. Fish tenders pick up fish from commercial fishermen. I own several vessels, so other captains work for me. Our boats are the *Georgia Straits*, the *Albatross* and the *Totem*. I was a commercial fisherman for 19 years but wanted my family aboard. Now, every summer my wife and two kids come along. When the kids were babies, they slept in a drawer in the pilot house! They're older now, but the rule still stands: they always wear a life jacket when they go out of the cabin.

We tender Cook Inlet set netters. Set netters place gill nets off the beach. They net all five species of salmon: kings, reds, pinks, chums and silvers. They pick the fish from the nets in skiffs. We lift the salmon from their skiffs with a *brailer*. A brailer is a net bag that you can open up on the bottom. It's lifted by a hoist. Fish are weighed while the brailer is suspended, then we open the brailer and drop them right into the ice and water in the *fish hold*. The ice water is circulated by air bubbles from the bottom, so it's called *champagne*. Our other tenders use huge refrigerator systems to chill the water and pumps to circulate it. Both methods keep fish really fresh.

In some areas we anchor *fish scows*. A scow is a barge for temporarily storing fish. The gillnetters put the salmon in plastic tubs called *totes*. The totes are then picked up by the tenders and emptied into the cold fish hold.

The fish processor takes the salmon from the tender by *wet fish pump*. They use a hose that slowly sucks up fish and water like a giant straw. The fish don't get bumped too much that way; they're always treated gently. Fish quality is extremely important.

We have good relationships with both the gillnetters and the processor. We bring the gillnetters their groceries and mail since there aren't any stores where they have their camps. We keep the processors working by bringing them fish. Everybody helps everybody else. That's the way it is in this business.

AKCIS ALASKA CAREER INFORMATION SYSTEM alaska sea week

Level VI Fish and Fisheries
Card 7

Captains manage the operation of the vessel. Their work involves administrative and technical responsibilities for the operation, maintenance, and safety of the vessel; planning and supervision of operations and maintenance on the deck and engine of the vessel; administration of business affairs such as purchasing, disbursing, and insuring compliance with customs and immigration regulations; and piloting vessels through rivers, straits, and harbors. A good tender captain learns everything about their boat, reacts calmly in stress situations, exercises good judgement, teaches people things "without making them feel stupid" and manages people "in ways that don't make them mad."

Deckhands do much of the deck work aboard vessels. They help casting away and tying up the vessel. They help operate hydraulic equipment, maintain refrigeration equipment, and help in sorting, icing, and unloading the fish. They may assist in steering and navigating the vessel. Hours can be long. During openings the work day may last 24 hours or more without a sizeable break. Wages can vary with years of experience. A $30 *[1989]* deckhand permit is required and deckhands usually supply their own rain gear. The work is seasonal. Physical strength is required on this job. The job can be dangerous. Aspiring deckhands should make sure prospective vessels carry proper safety equipment and that the skipper is a safe operator. Working up to vessel captain depends on ability to learn, enjoyment of responsibility and willingness to "complete tasks without being reminded." Fully-equipped fish tenders are expensive.

Activities:

1. Invite a captain of a fish tender or other vessel to class or visit them at their job. Prepare some questions beforehand. Back in the class, draw a picture of their boat and write a paragraph about it. Display your work.

2. Practice handling fish in the classroom. Show how important it is to handle the fish with both hands and to never pick the fish up by the tail. Discuss the issue of fish quality in the marketing of seafood. (Obtain materials from Alaska Seafood Marketing Institute, P.O. Box DX, Juneau, AK 99811 (907) 586-2902.

3. Differentiate among the five species of salmon. (Obtain materials from Alaska Dept. of Fish & Game, Box 3-2000, Juneau, AK 99802 or call: inside Alaska (800) 478-4286; outside Alaska (907) 465-4286.) Call a local fish processor and compare the prices for the five species. Write some math story problems using fish motif.

4. Identify safety equipment required aboard vessels. (Obtain materials from Alaska Marine Safety Education Assoc.(AMSEA), Box 2592, Sitka, AK 99835 (907) 747-3287 or U.S. Coast Guard Auxiliary, P.O. Box 3-5000, Juneau, AK 99802-1217 or U.S. Foundation for Boating Safety, 880 South Pickett St., Alexandria, VA 22304.

Set Netters

My name is Ed Iten. I'm a set netter in Kotzebue. Set nets are gill nets that we set in one place. Gill nets are made out of three parts: webbing, cork line and lead line. Cork line floats the top of the net on the water. Lead line weights the net bottom down. Each set netter is allowed to fish with 900 feet of net. Most fish with three 50-fathom nets because web comes in 50-fathom lengths. A fathom is six feet. The nets are held by anchors on both ends. It looks like a string of colored floats on the water. But when the salmon hit, the net dances with activity.

Kotzebue Sound is shallow. We fish in only 6 to 12 feet of water. In some areas we fish in only 3 feet! We mainly catch chum salmon, though we catch an occasional king and some humpies. Our season begins around the first of July. This year we got two 24-hour openings at first. Later it was two 36-hour openings then two 48-hour openings a week. The season pretty much ends by September 1. This year chums brought 25¢ to 31¢ a pound. Last year they brought 96¢. This year we only made enough money to pay for the gas and everything. It was a terrible year for most of us. But some people still made money–by catching a whole lot of fish.

You know something? I used to think that when a boat started to sink you had time to do something about it. Not always true. Two years ago we were coming home with a skiff load of fish. We hit a submerged log and the water shot up in the boat like a geyser. The boat sunk right to the gunnels. Lucky for us somebody was right behind us. This year we're buying an aluminum boat and survival suits.

You know what's best about set netting? You're your own boss. If you don't work hard, you don't make anything. And if you work hard, on a good year, you make a whole lot. That's a good feeling.

Level VI Fish and Fisheries
Card 8

Set netters fasten gill nets either to shore at one end and anchored in the water at the other end or anchor both ends in the water. The end(s) of the net(s) is marked with buoys. For set netters sometimes a skiff is unnecessary if the set netter waits until the tide is out to pick the net. Usually, though, a skiff is used to tend the net. Set netting is one fishery that doesn't require a large investment. An open skiff, an outboard and gillnet gear are the basic items required. Fish are picked by dragging the net across boat gunnels or commercial fishers may set up a goal post to guide the net and keep the boat perpendicular to the net. Many set net sites are hereditary, and are used for generations by the same family, though sites are legally first-come, first serve. Local knowledge regarding fish runs and fishing sites is mandatory for success. Set netting differs from drift netting. Drift netters allow the gill net to drift free keeping constant watch from a boat. Set nets are used in a number of salmon fisheries around the state. More Alaska salmon are caught in set and drift nets than with any other fishing gear. Net hanging and repair is an important skill in these fisheries. Some work is available hanging and repairing nets for others.

Set net fisheries are limited entry, and permits are expensive–costing tens of thousands of dollars, sometimes more. Mesh size and the length and width of the net are regulated by state law, as are openings and special regulations related to location and exact fishing method. A considerable capital outlay for the permit is required to enter the fishery. Set netters may require helpers, which need a $30 permit from the state. Working with a set netter is an excellent way to enter the fishery. Those entering the fishery, though, should carefully assess anyone they work with for safe conditions. As with other Alaska commercial fisheries, seamanship, survival skills and safety awareness are all-important.

Activities:

1. Invite a set netter to class or visit a set net site. Prepare some questions beforehand. Find out the advantages and disadvantages of work as a set netter.

2. Create some math problems related to gill nets and net lengths. For example, if a set netter has 30 fathoms of net, half of which leadline, and a third of which needs corkline, how much lead and corkline is needed? Create other problems involving fish prices and weights.

3. Make a model of a set net. You might use a piece of nylon stocking as your net, pieces of plastic straw as your corks and a piece of small steel cable as your leadline.

4. Hang or repair a gill net in class. Invite someone to show you how, or write for the publication "Gillnet Hanging" by Paula Cullenberg, Alaska Marine Advisory Bulletin #29, Univ. of AK Sea Grant College Program, UAF, Fairbanks, AK 99701.

5. Set a gillnet as a class project. (A special permit is available for educational institutions. Contact Commercial Fisheries Entry Commission, P.O. Box KB, Juneau, AK 99811. 465-4081.

Trollers

My name is Paula Terrel. I'm a power troller. We fish for king salmon, silvers, and pinks. We fish the old fashioned way: hooks on lines. Our boat is called the *Silver Fox*. She's a 40-footer. "All guts and no glory," we say. Trollers are only found in Southeast Alaska. There are two kinds of trollers: hand trollers and power trollers. Hand trollers crank in their lines by hand. Power trollers use *hydraulics*. Power trollers drag four lines in the water. Hand trollers drag two. The lines are dragged from long *trolling poles*. Each line holds about 40 baited hooks. Our troll season is June to September and October to April.

Trollers clean every fish we catch. As soon as they're caught we pop the gills and bleed them. The fish are handled carefully: never dropped or held by the tail. They're carefully iced in the hold until we sell them. Troll-caught kings are known as "white tablecloth fish" because of their premium quality.

We really pay attention to safety. We've got VHF, single side band and CB radios, radar and Loran. We make sure our survival suits are accessible and in top condition, our life raft is up-to-date and our EPIRB batteries are fresh. At sea you can never be too sure. And, oh yes–if it's too stormy, we just don't go. Period.

Fishing is stressful, but the freedom is great. If you don't do any work, you don't make any money: it's that simple. Sometimes we get up at 2 A.M. and stay up until midnight. What a long day! One time we were trolling off of Yakobi Island. All of a sudden the sea started to boil with life. Hundreds of porpoises spouted, whales sounded, sea lions barked and killer whales breeched. It was incredible. All the trollers were yelling on the radio, "Look! Did you see that! Wow!" Being on the ocean is wonderful: the smells, the air. I can't even describe it.

Level VI Fish and Fisheries
Card 9

Trollers use either herring or artificial lures to bait their leaders. All trolling occurs in Southeast Alaska. Salmon trolling vessels range from 12-foot skiffs to 75-foot vessels, but most power trollers are 30 to 50 feet long. Trollers may fish alone or may employ a deckhand, also called a puller.

Hand trollers crank in their lines by hand. Hand trollers are permitted to use either sport poles or hand gurdies. Larger vessels usually use hand gurdies. Usually hand trollers use two hand gurdies, which are large brass fishing reels, each having 50 to 100 fathoms of line made of steel cable from which four to six leaders dangle. If hand gurdies are used, the vessel often has two long poles mounted midships on the boat that are extended at a 45° angle from the boat. These hold the cables out away from the boat, making it easier to maneuver, and covering more fishing area. The poles are hinged, so when they are not needed, they can be pulled up straight. Cables are anchored at the bottom with a "cannonball" lead that holds the cable almost upright as it is dragged through the water. At intervals of two to four fathoms are two small brass sleeves a foot apart. A baited leader with a line snap on the end is attached between these two sleeves. Hand trollers can attach as many leaders as they want to the cable, but usually they use five to seven.

Power trollers pull lines with hydraulic gear. Power trollers may use up to four lines to which multiple leaders are attached. Power trollers usually use larger vessels, and usually have two sets of poles, one amidships, and one set near the bow, from which their lines are suspended. Limited entry permits for hand trolling are not as expensive as permits for power trolling, because hand trollers fish less gear, and consequently catch fewer fish and make less money. Power trolling permits cost more, but are worth more in income, since so many more lines and leaders may be used.

Activities:

1. Invite a troller or other commercial fisher to class or visit him/her at the docks. Prepare some questions beforehand. Back in the classroom, students write a paragraph about what they learned.

2. Buy 50' of cotton or nylon cord. Tape 2' lengths to shirt cardboard cards. Practice knot tying. Students should write the name of every knot they know on the cardboard. Discuss the types of knots a troller might use.

3. Practice knife sharpening in the class. Discuss the importance of a sharp knife to a commercial fisher.

4. Visit the docks where commercial fishers lay out their equipment. Differentiate among trolling, seining, longlining and crab fishing gear. Prepare some questions for the commercial fishers beforehand. If you visit river fishing sites, interview set gill net sites or fish wheel sites. Back in class write about what you learned.

5. Ask a commercial fisher about fishing songs they may know. Sing songs about fishing, sailing or whaling. Discuss the use of irony and other techniques in these songs or others. Write your own song about commercial fishing in your area. Perform the song for other students or in a school assembly.

6. Practice sharpening hooks in class, both single hooks and treble hooks. Dull hooks mean no fish, no matter how many fish there are.

Fish Processors

My name is Rick Ferguson. I'm a fish processor on the Kenai Peninsula. If you were a tourist and caught a huge halibut, you could bring it to us and we would clean and prepare the meat. If you were a commercial fisher, we would buy your fish from you, process it and sell it. To process fish we clean it, fillet it, then freeze or smoke it. I'm in charge of the smokehouse. I also remove fish heads, clean the fish and fillet it. Filleting means to cut the meat off the bone. To *fillet* fish well, you've got to have some good sharp fish knives. A sharp knife is a fish filleter's friend. But you've really got to be careful. You don't want to waste fish or cut off your finger! You need a table to set the fish on while you're working on it.

We smoke fish the old fashioned way. First we soak the fish in *brine* for 45 minutes to an hour. Then we cut the meat into strips and tie it to racks in the smokehouse. We use cottonwood and some alder when we smoke it. Boy that stuff smells good while it's curing! When it's cured and cooled, we vacuum pack it and keep it refrigerated. Tasty! For canned salmon, a modern machine does the canning, but we pack the meat by hand. Most of our salmon is frozen rock-hard, but some of it goes out fresh. During halibut openings things get a little crazy. Hundreds of halibut come in. Those 200 lb. halibut are really hard to lift! We work from six in the morning until twelve at night until the halibut is processed. That's the way it is in this business. Our salmon eggs are packaged for the Japanese market. The Japanese company we sell them to sends a couple of workers to make sure we pack them right. My wife works in the egg room. The Japanese are particular about how those eggs are packed! But salmon eggs are expensive in Japan, so I understand.

While we work we play some pretty good jazz on the cassette. This place has got atmosphere. Everybody's pretty cool. That's why I stay. It pays to work for a small company.

Level VI Fish and Fisheries
Card 10

Cannery and frozen food workers preserve and pack food products. In Alaska, the type of food is almost exclusively limited to fish and shellfish. Workers in this field stand for long periods, reaching and handling the product.

Opportunity is excellent to very good with 5,865 employed. Wages range from $900-$1,100 per month *[AKCIS, 1989]*. Much of the training is on-the-job. Good background courses include basic math and physical science. No Alaska postsecondary school has a program leading specifically to work in this field. Related occupations include food processors packers and wrappers. Food processing or handling experience is helpful but not required for these jobs. Many jobs are filled in advance, but some hiring is done during the peak season. Some plants hire union workers. Seafood processors utilize practical scientific and technological food processing data and procedures in the marine food processing industry.

Hand packers assemble cartons, insert products into containers, and seal and label containers for shipping. Machine operators tend machines that pack, mark, wrap, and sort. They also replenish packaging supplies. They observe machines to detect malfunctions. They also make minor repairs and adjustments.

Opportunity is fair in Alaska; 270 employed. Wages range from $800-$1,800 per month *[AKCIS, 1989]*. Much of the training is on-the-job. Good background courses include basic math, physical science and general shop/mechanics. No Alaska postsecondary school has a program leading specifically to work in this field. Related occupations include cannery and frozen food workers, food processing workers and meat cutters.

Activities:

1. Invite a cannery worker to your class or visit a local cannery. Prepare some questions beforehand.

2. Cook, clean and crack crab. Show the steps involved. Identify the edible parts.

3. Bring a salmon to class and clean it as it would be done at the fish processor. Grade the fish as a #1, #2 or #3.

4. Prepare salmon cakes with canned salmon. Make a poster outlining the steps involved in canning salmon. (Resources: Cooperative Extension Service, University of Alaska-Fairbanks, 303 Tanana Dr., Fairbanks, AK 99701.)

5. Vacuum package smoked fish or other foods in the classroom. Bring in a home unit or use a straw in a plastic bag to demonstrate technique. Properly prepare fish or other foodstuffs for freezing, e.g. freeze in plastic bag with water or use freezer wrap. Freeze the material and periodically check its condition. What helps prevent freezer burn? (Caution: Contact Cooperative Extension Service for proper technique.)

6. Fish Wrap Race: Cut a piece of wood in the shape of a salmon (or obtain salmon-shaped stuffed pillows). Students race down a set course, wrap the salmon in freezer paper, tape it, and race it to market (the finish line). Fish inspectors along the line (students) can verify that the fish is properly handled en route.

Purse Seiners

My name is Sonja Corazza. I'm a purse seiner. Our 40' seine boat is called the *Malamute Kid*.

Purse seiners fish with a long net. The *seine* has thick nylon strands and small mesh. The seine has corks along its top and a *lead line* along the bottom. Also on the bottom are steel rings. A line runs through those rings that is called the *purse line,* which gathers up the bottom of the seine and makes a bag that the fish cannot escape from. When we spot salmon, we use our 235 horsepower 18 ft. skiff to help tow the seine around the fish in a circle. That's called *round hauling*. When the fish are inside the seine then the skiff and the big boat bring the ends of the net together. Then we *purse* the set up which closes the bottom of the net so the fish cannot escape. We stack the net, corkline in one pile, lead line in another. When almost all the net is on the deck we then have a bag of fish in the water which is raised up over the *fish hole* in our big boat and then we let the bottom of the net loose and all the fish are dropped into our boat. When we seine for herring we use a seine with smaller mesh so the herring cannot get out. Pilots with small airplanes, who are called *fish spotters,* help us find both salmon and herring. We pay them a percentage of our catch . They radio us when they see a school of fish and then we try to catch them.

I love fishing, but it is a hard occupation. Our days are long. We might start the engine at 4 A.M. and not unload our fish until after midnight. When we finally have a day off, boy do we sleep! Also, our equipment is very expensive. One seine can cost over $20,000.

But this life lets our family work together. Our daughter Megan loves to stack the net. Sometimes there are a lot of jellyfish and she gets a rash on her face from jellyfish stings, but she usually keeps working anyway. Our son Rick likes to ride in the skiff and use the *plunger pole* to help scare the salmon into our seine. We're proud of our children for working hard on the boat. In Alaska fish are our greatest renewable resource. Our fish are food for the world.

Level VI Fish and Fisheries
Card 11

Captains manage the operation of the vessel. Their work involves administrative and technical responsibilities for the operation, maintenance, and safety of the vessel; planning and supervision of operations and maintenance on the deck and engine of the vessel; administration of business affairs such as purchasing, disbursing, and insuring compliance with customs and immigration regulations; and piloting vessels through rivers, straits, and harbors.

Deckhands do much of the deck work aboard vessels. They help casting away and tying up the vessel. They help operate hydraulic equipment, maintain refrigeration equipment, and help in sorting, icing, and unloading the fish. They may assist in steering and navigating the vessel. Hours can be long. During openings the work day may last 24 hours or more without a sizeable break. Wages can vary with years of experience. A $30 *[1989]* deckhand permit is required and deckhands usually supply their own rain gear. The work is seasonal. Physical strength is required on this job. The job can be dangerous. Aspiring deckhands should make sure prospective vessels carry proper safety equipment and that the skipper is a safe operator. Working up to vessel captain requires a limited-entry permit and proper licenses for other fisheries. Limited entry permits are expensive.

Activities:

1. Invite a purse seiner to class or visit him/her at their vessel. Prepare some questions beforehand. Back in the classroom answer the following questions: what kind of a vessel does a purse seiner use? What are the tools of the purse seiner? How does a purse seine work? Add your own questions and give the quiz to students.

2. Appoint three students to research fish spotting. Then, for the rest of the class they will take on the roles of bush pilot, boat operator and skiff operator and act out fish spotting for seiners. Pilots not only need to spot fish by species, they also need to indicate school size and direction. At the end of the skit, students should explain fish spotting and seine fishing to the other students.

3. Cut pictures of seiners and other fishing vessels out of magazines. Contact a local commercial fisher organization for back issues of fishing magazines. Make a display showing Alaska's different types of fisheries. Vessel models and samples of fishing gear can also be used.

4. Differentiate among the different fish species purse seiners catch (all five species of salmon and herring). (Obtain materials from Alaska Dept. of Fish & Game, Box 3-2000, Juneau, AK 99802 or call: inside Alaska (800) 478-4286; outside Alaska (907) 465-4286.) Call a local fish processor and compare the prices for the five species. Write some math story problems using fish motif.

5. Draw the floor plan of a galley on a fishing boat on butcher paper (actual size). Set up desks, etc. for counters. Then, plan a menu, and cook or make a lunch for 6-8 crew members in a set amount of time–to serve to the crew. Take time out to "run out on deck" to clean a fish, tend nets, coil lines or to bait hooks. (Time those activities with an egg timer.) When the timer rings, students need to return to the galley to finish cooking.

Public Relations Specialists

Hi! My name is Mary Gore. I work in public relations for the Alaska Seafood Marketing Institute. That's ASMI for short. It's my job to promote Alaska seafood. We do our best to help people know more about Alaska seafood, one of the world's best foods, through special projects. They call me a projects coordinator. Sometimes I give speeches to community and business groups. Other times I travel to trade shows like the National Restaurant Show, or the National Fisherman's Expo. In the summertime I take editors of famous magazines like **Good Housekeeping** or **Seventeen** on trips through fish processing plants. Sometimes we even put them on commercial fishing boats so they can see first-hand how we catch salmon.

In my job I have sponsored seafood recipe contests and written cookbooks. I have also planned *Seafood Week*, when we celebrate Alaska's greatest industry. Did you know that over 70,000 Alaskans work in the seafood industry, 19,000 of them year-round? That's a lot of jobs! I also talk on the phone with our advertising agency. An advertising agency helps sell products. ASMI's advertising agency takes nice pictures of Alaska seafood and places ads in newspapers and magazines. They just ran an ad in **Ladies Home Journal.** That should help business. I tell you, some of their photos make my mouth water!

I've been around the fishing industry my entire life. I started out cleaning fish on the slime line in processing plants. I then moved out on to a boat, a fish tender. We picked up fish from the commercial fishing boats and ran them back to town every other day. To have this job you have to like people and believe in what you're promoting. I love Alaska seafood and I enjoy working with people. By the way, would you like to sample a salmon burger made from canned salmon? It's tasty!

Level VI Fish and Fisheries
Card 12

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Public relations workers aid firms or clients in building and maintaining a favorable public image. They gather and analyze data and carry out a program to communicate the material to the public through printed matter, public appearances, TV, and radio. They handle community, press, or consumer relations and work for political campaigns, interest groups, lobbyists, or charities.

Employment opportunity is fair in Alaska; 205 are employed. Wages range from $ I ,600-$2,500 per month *[AKCIS, 1989]*. College is usually required in this field. Good background courses include basic math, physical science, oral and written communications, sociology, government, economics and marketing and distributive education. Alaska training sites include Alaska Pacific University, University of Alaska-Anchorage, University of Alaska-Fairbanks and University of Alaska-Southeast. Related occupations include human resources managers or personnel officers.

A 4-year degree, preferably in public relations, journalism, marketing, or communications, is necessary for most entry positions. A background in a field related to the employer's interest is usually desired. Employers require a neat, tasteful appearance and examples of a candidate's writing and verbal abilities.

Personnel officers plan and administer policies governing all phases of personnel activity, including hiring, compensation, and labor relations. Their duties include recruiting, interviewing, and hiring job applicants, counseling and disciplining employees, classifying jobs, and planning wage and salary scales. Opportunity is fair in Alaska; 930 employed. Wages range from $2,200-$2,400 per month *[AKCIS, 1989]*. Good background courses include advanced math, physical science, oral and written communications, psychology, sociology and economics. College is usually required for this profession.

Activities:

1. Contact the Alaska Seafood Marketing Institute, P.O. Box DX, Juneau, AK 99811 (907) 586-2902) and ask for posters, pamphlets and other materials related to Alaska's seafood industry or ask for the *Nutrition Catch*, an educational program teaching the value of nutrition and healthy eating with seafood. Designed for junior high and high school, it has also been successful in lower grades. Create a classroom or hall display in your school promoting the Alaska seafood industry.

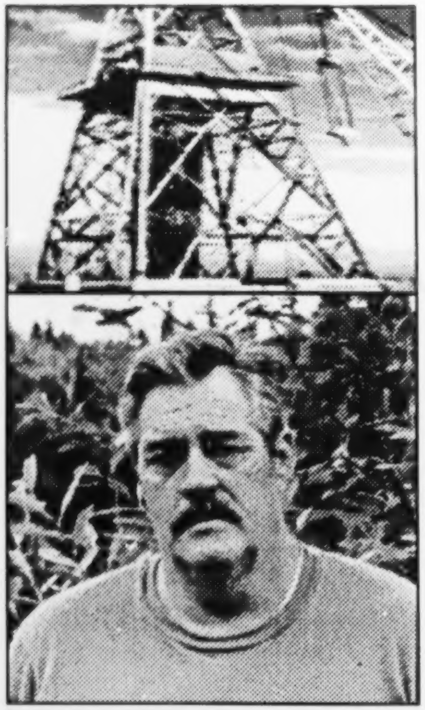
2. Prepare some attractive Alaska seafood dishes in the classroom, then invite parents or other students to come in and sample. (Recipes available from ASMI or at local bookstores.) Pretend you are serving the seafood to potential wholesale buyers. After serving them interview them to see if you made the sale.

3. Make your own posters promoting Alaska seafood. Place your posters in a local mall, grocery store or other public place during Sea/River week.

4. Bring in recipes from home and create an Alaska seafood recipe book. Concentrate on seafoods unique to your area. Illustrate your book and publish it, distributing it to each class member. Other books can be sold as a school fund-raiser.

5. Seafood is good for your health. Tie into the national promotional messages: *Eat fish and seafood twice a week* and *You eat 21 meals a week–shouldn't at least two of them be good for you?* by having students prepare one week of dinner menus featuring seafood entrées.

Offshore Oil Workers

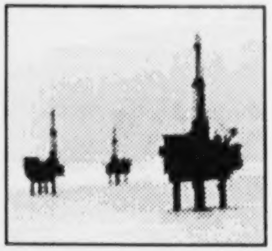


My name is Aubrey Best and I'm an offshore oil worker. I'm a pit watcher on the Shell "C" oil platform in Cook Inlet. I work down in the mud pits where we mix drilling mud. Drilling mud is the fluid which helps bring the cuttings (cuttings are earth and rock chewed up by the drill) to the surface. Mud is made out of water, clay, weighting material and a few chemicals. Mud helps reduce underground pressures. I help make sure that it's the right kind of mud for the right conditions. When oil and mud ooze out of the drill pipe, I clean it up so it doesn't pollute the inlet. You may think it's fun playing with mud all day long, but it's work. Underground gas, oil or salt water is under pressure. When we drill, some of the pressure is released. We control that pressure by adding more mud, or heavier mud. An out-of-control well is called a blowout. Blowouts are explosions. If there's gas present, there can be a huge fire. A blowout could pollute the inlet; it could waste precious oil and gas; it could destroy the entire oil platform worth millions of dollars and it could kill all the workers. The mud helps us prevent a blowout. That's why my job is so important.

For my job you use some brawn and some brains. I lift a lot of heavy bags of mud mix. And then I have to use math to keep track of the weights and how thick the mud is mixed. The most important item though, is safety. I started working for oil companies in 1974. I've had a number of jobs–floorman, derrickman, working with motors, just about everything except driller. I'm a roughneck. That means I've been trained for a specific job. The laborers are called roustabouts.

Following orders is critical because one mistake could cost a lot of lives. I watch out for myself and my buddies. Getting along with other people, is really important because we live on that platform for fourteen days at a time–in very close quarters.

I've been working on this oil platform for two years, two weeks on and one week off. I work twelve hours a day. It's true that my job is hard, and it's hard to be away from my family two weeks at a time. But the job has good pay, and that's good for me–and my family.



Level VII Marine Mammals, Coastal and River Issues
Card 1

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Pit watchers are petroleum helpers. Petroleum helpers perform a wide variety of manual tasks in oil and gas field operations. They clean oil field machinery, dig holes and trenches. They mix and pour concrete, load and unload delivery vehicles. They also clean up spilled oil and paint equipment. Opportunity is limited in Alaska; 680 are employed. Wages range from $1,600-$3,000 per month *[AKCIS, 1989]*.

Much of the training is on-the-job. Suggested training includes completion of an approved training program at a community college or vocational/technical trade school. Good background courses include basic math, physical science and building trades.

Suggested Alaska training sites include the Alaska Vocational Technical Center in Seward, University of Alaska and Kenai Peninsula College. Related occupations include petroleum derrick operators, rotary drillers and construction laborers.

Applicants must be 18 years old and in good physical condition. Employers prefer applicants with previous oil field or mechanical repair experience, although community college training in petroleum technology is also of value.

In offshore drilling, **rotary drillers** specialize in drilling underwater wells from barge-mounted derricks or from platforms.

Roustabouts assemble and repair oil field equipment. They connect tanks and flow lines, do maintenance work such as painting, sandblasting, and chipping, and help in loading and unloading boats.

Activities:

1. Make a wall chart, diagram or model of an oil well derrick or offshore oil platform. (Matchsticks could be used to construct drilling tower.) For excellent reference materials, contact *Alaska Resources Kit: Minerals (AKDOE);* Alyeska Pipeline Service Company, 1835 South Bragaw St., Anchorage, AK 99512 or The American Petroleum Institute (API), 1220 L St., NW, Washington, DC 20005. Discuss theories of where oil originates and how it was formed. (See above for references). Brainstorm ways that scientists can find new oil. Each student should draw a picture of a machine he/she would use to find new oil and describe below the machine how it works. Post your inventions on the wall. (Students could later find out what kinds of machines are actually used in finding oil and compare them with their own.)

2. Show a film about the oil industry. Contact API, Production Dept., Attn: Training Administrator, 211 North Ervay, Suite 1700, Dallas, TX 75201; Coronet Films, 108 Wilmot Road, Deerfield, IL 60015—*Oil, from Fossil to Flame;* Modern Talking Picture Service, 5000 Park Street N., St. Petersburg, FL 33709–*Pipeline, A Pipeline…and Animals* and *The Permafrost Frontier;* also Shell Oil Company films; Standard Oil Company Film Library, c/o Cinecraft, 2515 Franklin Blvd., Cleveland, OH 44113.

3. Ask someone who works in the petroleum industry to class to describer his/her job. Ask him/her to bring some of the tools of the trade along. Prepare some questions beforehand. Mark the location of Alaska's oil fields on a map of the state. Trace the path of the Trans-Alaska pipeline. Debate in class the merits/demerits of such a system for transporting oil. Discuss its difficulties including the danger of oil spills. Also, find out where your town, village or community obtains its oil (you might need to phone the local fuel distributor or a petroleum station). Trace on the blackboard all the steps and stages required in bringing oil to your community. (See #1 for references). Identify some of the jobs involved in each step and stage.

Loggers

I'm Mike Little. I live in Southeast Alaska. I'm a logger. In logger language I'm a *bushler*. That means I'm paid by how many thousand *board feet* I cut. A board foot is a block of wood one foot square and one inch thick. But I'm also called a *cutter*. I fall trees and cut them into logs. To do that I use a *chainsaw, single-bitted axe* and *wedges*.

Before I fall a tree I *pick a lay*–where the tree will hit when it falls. Then, I cut a pie-shaped piece of wood out of the tree so it falls where I want it to. My *falling partner* and I work at least three tree lengths away from each other for safety. When a tree's getting ready to fall I cry out *"coming down!"* so he knows it's falling. Measuring is very important. If a log is too short, the sawmill sure can't stretch it and make it longer. If it's too long, they have to cut it off. So, with my *tape measure* I check and re-check to make sure I measure right. Cutters always carry a whistle. If I ever blow the whistle that means I'm in trouble. Safety comes first. I always wear my *hardhat*. I'm always careful how I cut *the face*. The face is the side of the tree it falls on. I always wear my *chaps*, which cover and protect my legs. When the tree starts to fall, I put down my chainsaw and get out of the way. And I remember to look up–a lot. Before I start cutting a tree I look to see what could fall and hurt me.

Some people say that logging wrecks the forest. Others say it's like picking berries–you're just harvesting something that grows back. But one thing is true–all the loggers I know love the woods. We like being in the forest, working outside. And as a bushler, I'm my own boss. That's great.

Do me a favor. Sometime when you're writing at school just stop a minute and think of loggers like me. We cut the trees that make the pulp that makes the paper you're writing on. The very moment you're dotting an *i* or crossing a *t*, I might be in the woods shouting *"coming down!"* and a big tree might be falling with a giant crash! So, think of me, because sometimes when I'm falling trees, I think of you–writing on paper at school. That way we'll both think of each other. Ok?

Level VII Marine Mammals, Coastal and River Issues
Card 2

AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Fallers and buckers work alone in the woods or as one of a pair. They select the best direction for trees to fall and cut them down using a chain saw. Buckers work on the fallen trees, cutting off the limbs and then cutting the logs into specified lengths. Opportunities are good in Alaska; 455 are employed. Wages range from $3,300-$4,000 per month *[AKCIS, 1989]*.

Much of the training is on-the-job, though good preparatory training involves completion of an approved training program at a community college or vocational/technical/trade school. Good background courses include basic math, physical science and general shop/mechanics.

No Alaska postsecondary school has a program leading specifically to work in this field, though the Office of Adult and Vocational Education, Alaska Department of Education recently completed a secondary competency-based curriculum in Renewable Natural Resources/Agriculture. Forestry, Production and Processing classes may very well start in several industrial education programs around the state.

Most employers require a bucker to have previous logging experience as a choker setter and other logging jobs, and to be familiar with chain saws. Most fallers have worked for several years as buckers. Most learn the skills through on-the-job training, although formal training is available. Related occupations include choker setters, yarding and loading workers and log handling workers.

Activities:

1. Move, roll and drag a fallen log. You may want to to get the whole class to safely roll the log just a little, and you might try rolling it a little with a block and tackle.

2. Contact the Alaska Women in Timber, 111 Steadman St., #200, Ketchikan, AK 99901 and ask for *Alaska's Great Green Forest*, an elementary school curriculum offered free to Alaska teachers. Lesson 14 *Logging Camps* highlights jobs in the timber industry. Also ask them how to make paper in class from wood pulp. Identify the stages of paper production from falling timber to final retail sales. Make a poster for the wall employing all the different stages of paper production and rayon processing, incorporating samples of the product at different stages.

3. Invite a logger or someone who works in the logging industry to class. Prepare some questions beforehand. Ask him/her about their job. Ask the logger to demonstrate the use of a chain saw and other logging equipment. Ask him/her to demonstrate basic skills such as tree climbing, cable splicing, chain saw sharpening, etc.

4. Write for materials from *Resources for Teaching Forestry in Alaska*, Ag. Ed. Publication No. 1 (2nd Edition), rev. 1987, by Carla A. Kirts, School of Agriculture and Land Resources Management, UAF, Fairbanks, AK 99701. The publication lists hundreds of materials useful for teachers focusing on forestry. Many of the publications contain classroom activities.

5. Identify equipment used in fighting forest, brush and structural fires including firefighting suit, fire axe, CO_2 extinguisher, Halon, dry chemical, foam, hoses, nozzles and breathing apparatus.

U.S. Coast Guard Officers

My name is Ernie Pacheco. I'm a Coast Guard *ensign* on the Coast Guard ship Sweetbrier. The Sweetbrier is a buoy tender. That means it installs and repairs *aids to navigation*. Aids to navigation include buoys and range markers. Buoys mark dangerous places for ships. Range markers show captains the safest way to get into port. In the Coast Guard buoy tenders are painted black, so we call them *black boats*. All other Coast Guard boats have white hulls, so we call them *white boats*. Both black boats and white boats perform search and rescue and law enforcement. I just graduated from the U.S. Coast Guard Academy. Some of my classmates thought I was lucky. That's because I got a black boat and because I went to Alaska. On a black boat it's easier for a young ensign like myself to get to *conn* the ship. To conn the ship I call the headings for the helmsman, who steers the vessel. The heading is the direction we go. I love Alaska because it's so beautiful.

The 180-foot Sweetbrier is based out of Cordova. I've been there five months. It was a shock getting there at first because the town is so small. But people are so nice! I love my assignment. When the ship is in port I'm the In-Port Officer on Deck (OOD). That means I'm the one who makes the decisions. Also, I'm Food Services Officer, which means I oversee the cooks of the ship. That's a lot to do for somebody who's only 23 years old! But when you're an officer, you're trained to lead. That's my job. Some of the people I supervise are a lot older than me, and they know a lot more than me. But the Coast Guard is part of the military. Officers are in charge. That's our job.

Not long ago we saw something sad. We were called for search and rescue. We went out in the night. A tug was taking on water. The ocean waves were huge. The water was so rough. When we got there it was too late. The tug had sunk. The tow line from the barge led underwater to the sunken tug. The people died. I felt bad. In the Coast Guard we're there to help. And we try to help, no matter what.

Level VII Marine Mammals, Coastal and River Issues

Card 3

Military officers hold leadership and supervisory positions in the Army, Navy, Air Force, Marine Corps, and Coast Guard. They bear legal responsibility for preparing and carrying out effective military operations in defense of the United States and to support the government's foreign policy objectives. Opportunity is fair in Alaska; over 3,800 employed. Wages range from $2,000-$3,600 per month [AKCIS, 1989] (including allowances). Required training includes college and possibly graduate studies.

Good background courses include basic math, biology, oral and written communications, psychology, sociology and physical education. No Alaska postsecondary school has a program leading specifically to work in this field. A related occupation is military enlisted personnel. To become a military officer, graduation from an academy (such as West Point or Annapolis), an Officer Candidate School (OCS), or ROTC is required. To be admitted to OCS one must have a bachelor's degree with training in ROTC programs or already have completed advanced training in the military and 2 years of college.

U.S. Coast Guard personnel are responsible for the protection of the nation's coastline. They regulate foreign and domestic fishing within U.S. coastal waters, promote recreational boating education, and maintain navigational markers. All tours of duty are within areas under U.S. jurisdiction.

U.S. Navy personnel perform a broad range of duties that involve seaborne military functions. Extensive research and development in ocean-related disciplines are carried out.

Military enlisted personnel are employed by the Army, Navy, Air Force, Marine Corps, and Coast Guard. They bear the responsibility for preparing and carrying out military operations in defense of the U.S. and for supporting foreign policy objectives. Specialties range from basic combat to fields like electronics, medicine, accounting, computer science, aviation administration, food service, mechanics, communications, and law enforcement.

Activities:

1. Invite a Coast Guard officer to class or visit one on the job. Or, if you can't do either of those, find out information about the Coast Guard in Alaska. (Resources: Commander-OAN, USCG 17th District, Box 3-5000, Juneau, AK 99802-1217.)

2. Find out information on becoming a Coast Guard, Navy, Army or Air Force officer. (Resources: U.S. Military Entrance Processing Command, 2500 Green Bay Rd., North Chicago, IL 60064; (800) 323-0513.)

3. Learn how to use a VHF or CB radio properly. Many fishermen and other resource users have hand-held radios you can borrow. Role-play communications between a U.S. Coast Guard vessel and other vessels, both government and private.

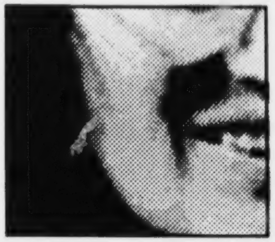
4. Put on a survival suit and get into the water (under supervision). A community swimming pool is a good place for practicing. Discuss the role of the U.S. Coast Guard in promoting and verifying safety on seas, rivers and lakes. (Resources: see #1 above).

Museum Curators

My name is Judy Hauck. I am a curator at the Alaska State Museum. Curators care for things in a museum. Some people think museums are fancy buildings, and in many cases they are. But museums are made up of *collections* of paintings or objects. Museums wouldn't be anything without their collections. All museums specialize in one thing or another–or types of things. Our specialty is *Alaskana*–the study of Alaska, her people and her natural features.

Alaska is surrounded by the sea and is crisscrossed with lakes and rivers. Many museum objects relate to life on the seas, lakes and rivers. In fact, every year we have a Sea Week exhibit at the museum. The museum houses preserved animal specimens, Native carvings, historic kayaks, even paintings and tapestries. Minerals in the museum may date back hundreds of millions of years; mastodon teeth may date in the tens of thousands. Other objects include Russian coins and lockets from the 1800s and a top hat and shoes from the goldrush. There's even an old pair of false teeth that some prospector left behind! As curator I help take care of all of these items and more.

Another part of my job is to add new objects to the collection. When I find something new and important, say an art print by an Alaskan artist, I obtain a good specimen, and bring it to the acquisitions committee. If the item is accepted, I give it a catalog number, then place it in our temperature-controlled vault for future display. I do the same for objects, jars, bottles, Native art–any objects which give an important glimpse into life in Alaska. Many of our objects are donated. Sometimes when I am cleaning and cataloging objects I think of the generations of people who made or handled them.



Many museums rely on volunteers to keep going. The people who give museum tours are called *docents*. Public museums belong to everybody. They help us keep both our treasures and everyday objects. They also help us learn about our seas, lakes and rivers–and the people who live and work on them.

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Card 4

Museum curators administer museums, art galleries, zoos, and historic parks and houses. They design and construct exhibits. They clean and repair objects for exhibition or storage. Keep records of the museum's collection They also handle budgeting, public relations, and coordination with other agencies.

Opportunity is limited in Alaska; 30 are employed. Wages range from $1,600-$2,900 per month *[AKCIS, 1989]*. College and quite often graduate studies are required, sometimes a PhD. Good background courses include advanced math, biology, chemistry, physics, oral and written communications, accounting, history, geography and art. No Alaska postsecondary school has a program leading specifically to work in this field. Related occupations include public administrators, social scientists, biologists, librarians, graphic artists, designers and taxidermists.

A bachelor's degree is usually the minimum requirement; however, many positions require or prefer a master's or PhD. A teaching certificate is required for some positions. Museum-related experience is essential, but a museum studies degree or certificate is not a prerequisite.

Maritime Historians focus their attention on historical events that were influenced by the marine environment.

Nautical Archaeologists study history through the underwater remains of early human cultures, discovered primarily by systematic excavations.

Museum and Aquarium Administrators manage the business aspects of, and oversee the construction of displays in museums and aquaria.

Activities:

1. Plan a Sea/River Week exhibit. First, you'll need to collect your objects. Old, odd or interesting objects are usually the type which go in a museum. Students or students' families may possess such objects or they may be borrowed. The exhibit should have a statement of purpose, as to why you are displaying these objects.

2. Visit a museum. All of Alaska's major towns and cities have museums. Even a small museum can offer a quality visit. Be sure to arrange your visit beforehand so museum personnel can prepare for your visit.

3. Invite a museum curator or other museum employee to your class. Ask him or her to bring along a traveling exhibit if they can. Prepare some questions beforehand. Be sure to ask him or her about their job when they visit, especially how they got the job and their likes and dislikes about it.

4. Write the Alaska State Museum for Traveling *Museum Kits*. These kits are distributed free to schools statewide. Address: Alaska State Museum, 395 Whittier St., Juneau, AK 99801 (907) 465-2901. FAX: 465-2976

5. Have students practice giving tours to outside groups, whether visitors to the school or younger schoolchildren. They can offer tours of a natural area on the school grounds or displays (especially #1 above!) within the school. Have them practice good tour guiding skills, including clarity, courtesy and correctness.

6. Set up and maintain an aquarium exhibit. Invite other students to visit your exhibit with docents who will give a guided tour. Prepare handouts for each student explaining what they will see. Find out information about each fish species, which alternating docents can relate.

7. Create a chronology and bibliography of Alaska's early explorers.

Meteorologists

My name is Leif Lie. I have been a meteorologist with the National Weather Service for the past 30 years. During this time I have forecast the weather at various locations in the Lower 48 and in Alaska.

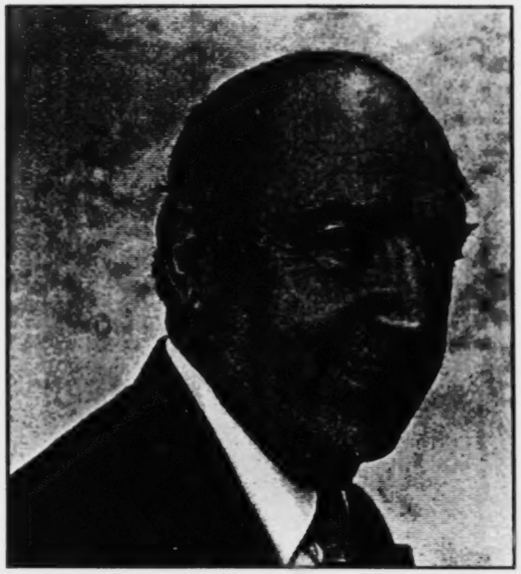
To forecast the weather we need observations both at the surface and from balloons and satellites. We estimate the sky cover by just looking up. If the sky is half covered with clouds, we say that's *five tenths cover*. We estimate visibility by how many miles we can see. We also take sea level pressure, temperature and dewpoint, wind direction and speed, altimeter, and add some remarks. We take these observations every hour.

To get weather information aloft we send up balloons twice a day from selected stations. Our sounding from Annette Island, Yakutat and Whitehorse are very helpful to the forecasters in Juneau. Satellite and pilot reports are also available to us and are very important to locate developing weather systems and storms. All this information is used by our computer to draw weather maps and to give forecasts.

Weather forecasting is a 24-hour business, 365 days a year. In Alaska, we have three forecast centers: Anchorage, Juneau and Fairbanks. The weather forecast responsibilities are divided between these three offices.

Studying and forecasting the weather can be fascinating because no two weather systems act alike. And just when you think you know it all you will get your biggest surprise.

Accurate and dependable weather information is important to nearly everyone in Alaska. Our forecasts have been improving, but we still have a long, long way to go before we reach 95-99% accuracy. I like meteorology. I see something new all the time.



Level VII Marine Mammals, Coastal and River Issues

Card 5

Meteorologists study atmospheric conditions and related data to obtain information for short-term and long-range weather forecasting. They conduct research on long-range forecasting, radio wave propagation, and severe weather phenomena such as typhoons and hurricanes. They gather and analyze information on atmospheric conditions. They attempt to identify and interpret past weather trends and predict future weather. They may also teach or conduct research. Opportunity is fair in Alaska with 80 employed. Wages range from $2,100–$3,300 per month *[AKCIS, 1989]*. College is required, as may be graduate studies. Suggested courses include advanced math, physical science, physics, chemistry, oral and written communications, history, geography and computer applications. A course of study in meteorology is offered at the University of Alaska/Fairbanks. Related occupations include physical scientists, geologists, oceanographers and university and college teachers.

Although the minimum requirement for employment is a bachelor's degree with a major in meteorology, an advanced degree is increasingly necessary for obtaining a job or for promotion. Many employers require computer skills. This occupation also exists in the military services.

Activities:

1. Visit a U.S. Weather Bureau station or other weather facility. Virtually every community has a weather station at the airport or at the harbor.

2. Invite a weather forecaster to the classroom. Before he or she arrives, devise a long list of questions to ask him/her. Such questions might include, how do you get to be a weather forecaster, and how do you know if a storm is coming? Or, how can you tell if an impending storm will bring rain or snow?

3. Ask a bush pilot or boat captain to the classroom to discuss how weather is important in their profession. Ask where they obtain their weather reports, and the types of observations they rely on the most.

4. Maintain a weather station at your school. Provide a daily weather report as part of the announcements or include them in the daily school report.

5. Listen to the weather forecast from the U.S. Weather Bureau, flight service or clip the weather forecast out of the newspaper daily. On a rotating basis have students act as *weatherperson*, reading the weather report locally and around the state to other students. Watch weather reporters on television to see how to do it. Write the weather report on the blackboard daily.

6. Create an anthology of songs related to the weather. Such songs as *Stormy, Kentucky Rain and Sunny* might start you off. Devise a performance for younger students which features the weather.

7. Devise a quiz game with clues related to weather and weather phenomena. For example, on the front of the card it would say *thermometer* and on the back the clue *measures temperature*. Create a stack of such game cards and play *Weather Bee*, which operates like a spelling bee. Weather off until a weather-wise winner is declared!

Vocational Marine Technology Teachers

My name is Don Ronda and I am a vocational marine technology teacher. This is just a fancy name for a person who teaches high school boys and girls the skills they will need if they work on boats or ships. People who do this kind of work are called "seamen." Seamen must know many interesting things. They should like to work with their hands and be able to build or repair things made of wood, metal, or plastics. They should understand how engines and pumps work and be able to use and fix them. Seamen need to know how to tie knots and use ropes and pulleys to safely lift heavy weights, pull on things, or tie things down. These skills are called "mechanical skills." Seamen should know how to read maps of the ocean called "charts", know the "rules of the nautical road"so they don't bump into other boats, know how to use a compass, and how to operate depth sounders and marine radios. Finding one's way on the ocean using such skills is called "navigating."

Some seamen make their living by catching fish. These "commercial fishermen" need to know how to use rope and twine to make fishing gear and repair fishing nets. They also have to know about different kinds of fish, where they live in the oceans, and how to catch them. For safety, all seamen should know how to swim and how to use lifesaving equipment carried on boats. The boys and girls in my classes practiced all of these skills. Getting ready for jobs on boats or ships was a lot of fun. Many of my students now earn their living on the sea. I'm glad I helped them learn how to do their jobs.

I learned how to be a vocational marine technology teacher by studying at college. I also enjoyed operating boats as a hobby. As an adult I worked as a commercial fisherman, a pilot boat captain, a boat builder, a ferryboat captain, and a sportfishing guide. All of these experiences helped me become a vocational marine technology teacher, the job I like most of all.

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AKCIS ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Vocational education teachers may teach subjects related to the marine environment. They teach the practical and technical aspects of specific trades to students in public or private schools, community colleges, or to workers in industrial plants. They train youth and adults in the basic skills of a trade, or train skilled people in the latest production processes and technological innovations. Additionally, they prepare, give, and grade tests, often writing or updating curriculum. Opportunities are excellent in rural areas with over 700 employed. Salaries range from $3,000-$5,600 per month *[AKCIS, 1989]*.

Suggested training includes completion of an approved training program at a community college or vocational/technical trade school. College is required. Good background courses include advanced math, physics, chemistry, oral and written communications, sociology, typing, general shop mechanics, and electronics/electricity. Alaska training sites include University of Alaska-Fairbanks and University of Alaska-Southeast. Related professions include elementary and secondary teachers, university and college teachers and special education teachers

Secondary schools require a teaching certificate; community colleges do not. Industry does not require a certificate to teach, but having one will enhance opportunities. Applicants must have a high level of skill and considerable experience in the field.

Activities:

1. Invite a vocational education teacher to the class or visit one on the job. Prepare some questions beforehand. Be sure to ask him or her about their job, especially as it relates to Alaska's seas, lakes and rivers. For example, do their students work on boats? Do they study galley cooking? Back at the classroom, draw pictures of a marine technology teacher and the types of projects they work on.

2. Make a boat model as a class project. Plastic models are available at any hobby shop. Put the boat together one part a day, and write the name of the boat part on the board. That boat part can be your word of the day.

3. Visit a museum. Count the number of objects you see which came from Alaska's seas, lakes and rivers. Back at the classroom make a list on the board of the items. How many did you count? Students can draw pictures of the items they remembered.

4. Duplicate basic outlines of a fishing and/or other vessels on white paper, duplicate pages from coloring books, or have students draw their own boat outlines. Students then add commercial fishers, a boat wheel, crabpot, fish hooks, foods for the galley and other items which might be found on a boat. If they don't know what it looks like, they may ask their neighbor. Display the pictures when completed.

5. Visit a small boat harbor. Ask about the kinds of boats you see there. Are there boats used for pleasure? Are there boats used to catch fish? Are there boats used to carry freight? Are there any special purpose boats like fireboats, police boats, ferry boats, sailboats, or Coast Guard boats? How do these boats look? Draw a picture of your favorite kind of boat.If you live in a large city, visit the port area with an adult. (Port areas are dangerous places to visit unless with someone who knows how to stay safe.) Look for docks and wharfs where large ships tie up to load or unload cargo. See if there are large cranes which lift the cargo. What other equipment is used to handle cargo? (Trucks, tractors, trains, warehouses, stevedores.) What kinds of large ships are at the port? Are there any tugboats? Write a report of what you see at the port.

Environmental Lawyers

My name is Connie Sathre. I'm a lawyer for the National Marine Fisheries Service. The National Marine Fisheries Service is a federal agency which has jurisdiction over marine mammals, fisheries from three to two-hundred miles offshore, fisheries under international agreements, and fisheries habitat conservation and protection. The National Marine Fisheries Service has four lawyers in Alaska. Most of our work is with fisheries management, fish habitat and fisheries enforcement. We also take care of administrative matters for the agency.

The subject matter of my job is interesting. There is always something new to learn or figure out. I work closely with Marine Fisheries enforcement agents. These agents are fisheries police. They go out with the Coast Guard and they patrol docks to make sure that fisheries laws and regulations are followed. If they find a violation they write a report and then I prosecute the case. I also review regulations written by fisheries managers to make sure that the regulations are reasonable and legal. Other lawyers in my office attend meetings of the North Pacific Fisheries Management Council and the International Pacific Halibut Commission. Those groups manage the fisheries. As lawyers, we advise the members of what is legal and what is not.

I always liked biology and law, so my dream was to combine the two subjects as an environmental lawyer. Well, here I am! My job includes a lot of reading and writing–and talking on the phone. Sometimes I travel to meetings, and once I spent two weeks at sea on a Coast Guard cutter boarding foreign fishing boats! I really like my job. It took a lot of school, but I'm glad I did it.

Level VII Marine Mammals, Coastal and River Issues

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AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

Lawyers represent clients in courts of law or negotiate out-of-court settlements. They examine evidence, research public records, codes, statutes, and previous decisions, and interview witnesses. They also advise clients of their legal rights and obligations in such matters as land sales, taxes, and labor relations.

Environmental Lawyers implement and interpret federal and state environmental law. They may work for an environmental group, represent development interests or work for federal or state governments.

Ocean/Coastal Lawyers are responsible for the implementation and interpretation of national and international marine law, and the laws governing coastal zone management. An admiralty lawyer specializes in legal matters that relate to inland waters and the high seas.

In Alaska 1,725 lawyers in general are employed. Wages range from $2,700 to $7,100 per month. Graduate studies are required. Suggested courses include advanced math, chemistry, biology, oral and written communications, sociology, history, government, economics, and accounting. No law schools exist in Alaska. Alaska training sites for prerequisite studies include the U of AK-Anchorage. Related occupations include legal assistants.

Those with a high academic standing in law school, knowledge of the community, and some experience will fare best. They often start as law clerks or assistants to lawyers and judges. Licensing is required. Three years of college are required for law school, but a 4-year degree is preferred. Also needed are high scores on the admissions test, excellent grades, and good recommendations.

Activities:

1. Invite a lawyer to your classroom. Ask him/her the types of cases they get involved with, especially in regards to the seas, coasts and rivers.

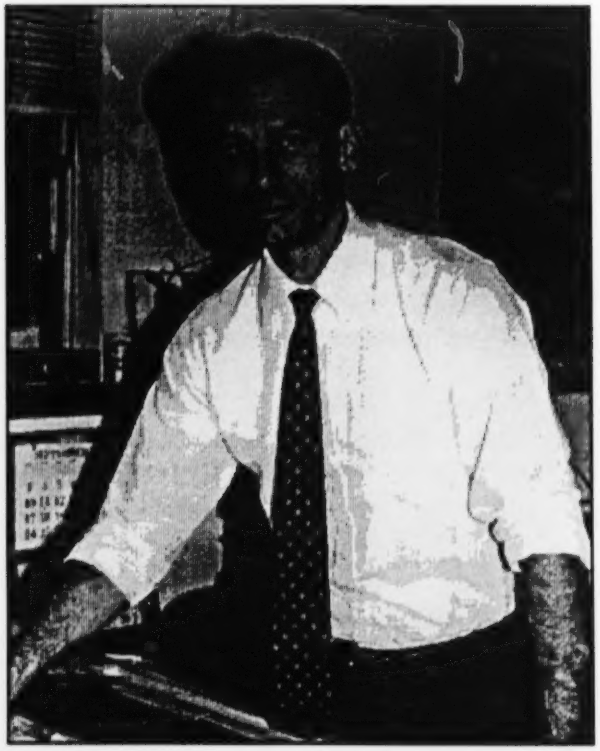
2. Conduct a mock trial in your classroom. Have a group write a situation dealing with something which could happen locally–in your community. For example, someone has been seen pulling halibut gear during a closure. Select a judge, defendant, prosecutor, defense lawyer, court recorder, and jury. Have the defendant present his/her side of the case along with an explanation of the circumstances. Have the prosecutor (the NMFS lawyer) argue his/her side of the case. The judge should maintain order, and the jury should decide on a verdict. Then, the judge should impose sentencing. (Actual sentences for the above offense are: forfeiture of the boat and the fish, a $50,000 fine and 6 months in jail.)

3. Invite a commercial fisher to the class or visit him/her at the dock. Ask him/her about the role of the National Marine Fisheries Service and North Pacific Fisheries Management Council in the management of Alaska's fisheries. Ask him/her about ways that a NMFS lawyer could help the Alaska commercial fisher.

4. Have your librarian request copies of various North Pacific Management Council plans and newsletters. They can be obtained from the North Pacific Fisheries Management Council, 605 W. 4th Ave., Room 306, Anchorage, AK 99501. Also have the librarian obtain a copy of the regulations of the International Pacific Halibut Commission, P.O. Box 95009, Seattle, Washington 98105. Divide the students into four or five groups. Give each group a Xerox page from those plans or regulations. Have them read the page for ten minutes, then, appointing a group leader, have that leader stand and explain what the law or regulation discusses.

5. Ask the students how the job of environmental or fisheries lawyer would differ from the job of defense lawyer or other types of lawyers. Discuss how the types of studies an environmental lawyer might pursue are different from those of another type of lawyer.

U.S. Army Corps of Engineers Personnel



My name is Dale Berry. I'm a civil engineer for the U.S. Army Corps of Engineers. Civil engineers design and build the everyday things around us, like buildings, streets, bridges and port facilities. We design and construct the buildings, streets, utilities, and bridges that are on many U.S. military bases. We also design and build certain structures for cities and towns along our nation's coasts and rivers; these structures include breakwaters for ports and harbors, navigation channels for ships, erosion control projects, and dams for hydropower and flood control. We also help protect wetlands with our permit requirements. If something will damage wetlands or the coast, the Army Corps won't allow it.

My job is with *feasibility studies*. If something is feasible, that means it can be done. For example, what would it take to be able to design and build something, say a new breakwater? Breakwaters can be big piles of rocks or walls of blocks or steel which protect a port from waves. First of all we have to see if the community really needs the breakwater. Then, we see if a breakwater *can* be built there. That might involve measuring the waves, the currents and the ocean or river bottom. Many engineers and specialists are involved in the measuring and design. Then we examine what effects the breakwater might have on the environment. And lastly, we see if we can afford it. That depends on the community, too, because the Army Corps only pays for part of a project. I put the data I collect into a report that goes to our headquarters in Washington, DC where they decide if the Corps should help build the project.

To build something right in Alaska takes a lot of effort. Here the sea and ice are powerful, the rivers are swift and the temperatures are extreme. Engineers can build just about anything if there's money to pay for it, but the engineering challenge is to build something for the amount of money that is actually available. I like this work. If you like to figure out how things work or how to build things, you would like being a civil engineer, too.

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AKCIS
ALASKA CAREER INFORMATION SYSTEM

alaska sea week

U.S. Army Corps of Engineers personnel are responsible for the design, construction, and maintenance of dams, navigational waterways, rivers, harbors, and shoreline structures for states, cities and towns, and buildings, streets, bridges, and utilities on U.S. military bases here and abroad. Civil engineers design and supervise construction of such structures as roads. Their duties include drawing up plans, making models, comparing costs of various methods, and ensuring the project complies with regulations. Civil engineers plan, design and oversee construction and maintenance work in and around specific harbor areas or projects. The civil engineer also supervises field survey parties and maintains an accurate and up-to-date set of topographical maps indicating the depth, contour and other characteristics of the harbor area. They also prepare plans for required maintenance and construction projects and inspect these projects.

Opportunity is limited in this field with 1,120 employed in Alaska. Wages range from $2,300-$4,100 per month *[AKCIS, 1989]*. This job usually requires a college degree. Good background courses include advanced math, physics, chemistry, oral and written communications, physical education, drafting, general shop/mechanics and computer applications. Suggested Alaska training sites include the Univ. of AK-Anchorage and Univ. of AK-Fairbanks. Related occupations include construction superintendents, mechanical engineers, electrical engineers, petroleum engineers and mining engineers. Employers prefer engineers with a degree and 2 to 5 years of experience. Some require a knowledge of computers. Upper-level positions in government or with firms that offer public services require a license.

Activities:

1. Visit an Army Corps of Engineers office or invite Army Corps personnel to the classroom. Prepare some questions beforehand. Ask about a specific project of which you are familiar such as the Chena Flood Control Project in Fairbanks, etc. Back at the classroom, write some sentences about what you have learned. Then, on a rainy day dam some puddles of flowing water around the school and see what it takes to control the flow of water.

2. Take a harbor/dock/shoreline walk and observe and discuss the design, construction and maintenance of bulkheads, docks and pilings. Back in the classroom look up at the lights. They were brought to Alaska on barge. So were the walls, floors, paint, wires, pipes, signs, chalkboards, and most of the other things used to make your building. Engineers the barge, tugboat, docks, breakwaters, and dredged channels to get them to you.

3. Visit an erosion control project such as a rip-rapped river bank. Draw a picture of a rip-rapped riverbank and on the picture write about why erosion control is needed and how it works. Invite a Native elder or other person who has lived in your area for some time into the classroom to talk about the changes in lakes, rivers and seashores as a result of Army Corps construction projects. Ask his/her opinion of the projects.

4. If you try to stand a flat sheet of paper up on its edge it will fall down. But you can make it strong enough to stand and even support an apple, by changing its shape. Change its shape by rolling it into a tube and taping it or folding it accordian-style. Engineers use these same ideas with steel, concrete and other materials to build strong structures.

Seal Hunters

My name is Darvin Nelson. I am an Inupiaq subsistence hunter from Kotzebue, Alaska. I work as a carpenter most of the time, but *oogruk* (bearded seal) and spotted seals help provide a lot of food for my family.

We hunt oogruk and spotted seals in the springtime when the ice is out. We wear white outer clothing that blends into the pack ice once we are out there. This helps camouflage us as we do not want to scare any game. We also try to stay down wind in our boat, and keep behind some icebergs if possible. This helps us get in closer when the oogruk is laying on ice.

We run the outboard real steady, a man at the bow is ready at all times. When we get within our shooting range he shoots. A shot to the neck is best for a quick kill. We then gut the oogruk right away and haul it into the boat.

Back in town we turn them over to our wives and other helpful hands. They skin them with ulus and separate the skin and blubber from the meat. Later the blubber is separated from the skin with an ulu. The meat is cut into strips and dried outside. When it's dried it's put into barrels along with the oil. We store the dried meat in seal oil and we use the rest of the seal oil to eat with dried fish. Have you ever had seal oil and dried fish? Delicious!

In Inupiaq culture we share with relatives, friends and the elderly people: those who are no longer able to go out and hunt like they use to. So, we share with them (the elderly people) for it is they that taught us how to be hunters, and to survive out there if we have too. We remember never to waste anything. That is important.

We're always careful when we hunt. We tell someone where we're going and we take along our survival gear. We watch the weather and we stay alert. The ice and the sea can be unforgiving.

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Subsistence hunters provide food for numerous Alaskan families. Subsistence is a controversial issue. Though it is a difficult concept to define, federal law states that subsistence is "the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter or sharing for personal or family consumption."

The state of Alaska has established subsistence use of fish and game as the highest priority consumptive use of the resources. Alaska's legislature passed subsistence priority laws in 1978 and 1986. The U.S. Congress passed a priority subsistence law in 1980 for federal lands in Alaska. According to Alaska state subsistence statutes passed in 1986, only rural residents can be considered subsistence users. In addition to the rural requirement, subsistence uses can be identified by a variety of other criteria, such as long-term traditional use, local area use and frequent sharing of game resources, and is not authorized if harvesting will damage the resources.

Subsistence hunting regulations are included with the annually-published state hunting regulations, available from the Alaska Department of Fish and Game, P.O. Box 3-2000, Juneau, AK 99802. Pick up a copy of Alaska Game Regulations at virtually any gun store, sporting goods store, or Alaska Fish and Game office, or from the local fish and wildlife protection officer. Licenses, metal locking tags, harvest reports and tickets may be obtained from any designated issuing agent or by mail from the Department of Revenue, Fish and Game Licensing Section, 1111 W. 8th Street, Room 108, Juneau, AK 99801 Phone (907) 465-2376.

Activities:

1. Invite a subsistence hunter to class, a seal hunter if possible. Prepare some questions beforehand. Be sure to ask him or her about how they learned how to hunt and different uses for the game.

2. Use a home pressure cooker to can salmon or wild game. (Caution: home canning can be dangerous. For proper procedures contact Cooperative Extension Service, University of Alaska-Fairbanks, 303 Tanana Dr., Fairbanks, AK 99701.)

3. Tan a seal skin, moose hide, beaver skin or rabbit skin as a classroom project. (For proper procedures, contact Cooperative Extension Service–pamphlet *"Tanning at Home" A-003209.)*

4. Investigate Alaska's seals and who can harvest them. Have students draw pictures of Alaska's seals and label them. Resources: Wildlife Notebook Series, Alaska Dept. of Fish and Game, Box 3-2000, Juneau, AK 99802.

5. Have students write an adventure story about a subsistence hunter. Stories should be as authentic as possible. Illustrate stories and post them on the wall.

Welders

My name is Walter Swearingen. I'm a welder. I repair ships and other vessels in Homer. I used to work for the Navy. That's where I got my training.

Welders stick steel and aluminum together with electric welding machines. When you glue things together the glue does the sticking. When you weld metal, though, *welding rod* helps the metal actually melt together to form a very strong bond. A weld can be stronger than the metal itself. Aluminum and steel is cut with *oxyacetylene equipment*. Oxyacetylene equipment mixes pure oxygen with acetylene gas to make a white-hot flame. When a steel vessel has a hole in it, it generally has to go to *dry dock*. Dry dock is where it's brought out of the water. Sometimes welders work underwater, but they can't do as good a job. Underwater welding is usually temporary.

Welders make sure their welds are strong. A small crack in a weld in a ship's hull or a bad weld on a ship hatch could endanger the vessel. So welds are tested with *X-rays, ultra-sonic equipment, radiographic equipment* or *dye penetrant*. Welders have to be certified. That means we've passed a test. Welding tests aren't written tests–they're practical. Welders also make sure they're safe when they work. We wear masks, gloves and a leather apron. We're careful because we work with high-voltage electricity and hot metal.

One time a fishing boat was on the *grid* on the Homer Spit. It needed a new engine. We had to cut a hole in the side of the fishing boat, put the engine in and weld it back up before the tide came back in! That was some quick work!

Welders get good pay. And welders can work practically anyplace in the world. If you could work anyplace in the world where would you go? I picked Homer. Wouldn't you?

Level VII Marine Mammals, Coastal and River Issues
Card 10

Welders are skilled workers who perform welding aboard ship or in the yard. The welder, working with electric welding equipment, fuses metal parts together to fabricate, repair, or enlarge objects or equipment. They use a variety of heating techniques, permanently joining pieces of metal together in items such as vehicles, bridges, and pipelines. They determine what type of technique should be used. They place parts to be joined in position. They guide the welding or soldering gun or torch along the joint to be welded. They examine how metal pieces are fused to see if the weld meets specifications. Opportunity in Alaska is limited with about 530 employed. Wages range from $2,200-$3,200 per month *[AKCIS, 1989]*. Suggested training is on-the job. Suggested background courses include basic math, physics, physical science, general shop/mechanics, welding and drafting. Alaska training sites include Alaska Vocational Technical Center; Hutchinson Career Development Center-Fairbanks; UAS, Sitka Campus; UAS, Ketchikan Campus; UAA, Kenai Peninsula College-Soldotna; Peninsula Institute of Welding Technology-Kenai and Testing Institute of Alaska-Anchorage. Related occupations include boilermakers, sheet metal workers, millwrights, ironworkers, plumbers and pipefitters.

Although some jobs can be learned after a few months of on-the-job training, generally it takes several years to become a skilled arc or gas welder, and somewhat longer to become a combination welder. Skills can be learned through community colleges, technical schools, on-the-job, and in formal apprenticeship programs. This occupation also exists in the military services.

Activities:

1. Invite a welder to class or visit him/her at their job. Prepare some questions beforehand. Identify the tools of the welder.

2. Students can draw a self-portrait of themselves as a welder.

3. Ask several students to differentiate among the following ways of fusing and cutting metal: Oxyacetylene Welding and Cutting (OAW & OFC•A); Shielded Metal Arc Welding (SMAW) and Air Carbon Arc Cutting (CAC•A); Gas Metal and Flux Core Arc Welding (GMAW & FCAW); Gas Tungsten Arc Welding (GTAW) and special welding processes. They can find this information out at the library or by interviewing someone in construction. The students should, for extra credit, summarize and report their findings to the class. Which techniques are commonly used in ship repair?

4. With a small saw remove a piece from a ship model. Appoint a ship repair crew in the classroom to repair the missing plate. Discuss methods of ship repair and cut out pictures regarding same.

5. Examine different sizes and types of welding rod. Discuss their uses. Wear welding helmets and gloves. Brainstorm the importance of safety preparedness to the welder.

6. Compare metal strength of welded metal with non-welded metal (a weld shop can supply samples). Which is strongest? Why? Ask students to explain how principles of welding work. (Look up in encyclopedia and make a report.)

Market Research Consultants

My name is Alex Kochkin. I'm a market research consultant. That means I find and analyze market information. A market is where things are sold. [Sometimes markets are defined by place and sometimes by individuals with something in common.] So, if the client wants to sell something, they have to know what their market is. That's where I come in. I find out things for them so their product will be right for the market.

But there's more to it than that. There's the whole issue of whether the client knows how to make the product right. And then there's the issue of whether or not somebody else has already thought of it. I can help the client with that too. How do I do that? With computers. We search *computer databases* for information. Databases are huge lists of information on computers. The lists are arranged so you can find information of a certain type. Computer databases make it easier to find things and find things fast from many different sources.

In Alaska, a lot of the products are seafood. For example, people might want to know how individual portions of smoked halibut would sell down south. We can help them find out. A town might want to attract seafood processing companies to their waterfront. We can help them make the right contacts. The Alaska Seafood Marketing Institute's advertising agency might want to know the best way to picture salmon in an advertisement. We can give them information to develop ideas. [Finding facts and measuring opinions for the client is our speciality.]

The best part about this job is all the different projects I work with. Whether it's fish products or tourist souvenirs, if there's a product and there's a market, there's information the client needs to know. That's our business. Can I offer you a business card?

Level VII Marine Mammals, Coastal and River Issues
Card 11

Market research analysts monitor and analyze the marine products market in an attempt to answer questions about consumers, dealers, and competitors. The products include seafood, boats and accessories and fishing equipment. The analysts work in research involving social and economic trends, as well as human motives and patterns of human behavior.

Marine economists study and analyze the economic factors involved in marine-related products distribution, and the use of techniques of financing and marketing. They also examine and make suggestions for improvements. Organizational structures of marine-related business concerns are outlined. Governmental regulations and requirements are studied.

Statisticians collect, analyze, and interpret marine data. They summarize findings in tables, charts, and written reports for use by professionals in the marine industry.

Applied statisticians survey, collect, organize, interpret, summarize, and analyze numerical data related to sampling. Through the use of statistical tools, they interpret the data gathered in marine-related studies.

Public relations workers aid firms or clients in building and maintaining a favorable public image. They gather and analyze data and carry out a program to communicate the material to the public through printed matter, public appearances, TV, and radio. They handle community, press, or consumer relations and work for political campaigns, interest groups, lobbyists, or charities.

Activities:

1. Invite someone involved in product marketing to the class or visit him/her on the job. Prepare some questions beforehand. This person may range from a market research consultant to a salesperson at the local general store. Back in the classroom students write a paragraph about the importance of information to product marketing.

2. Visit a local fish buyer. Ask how many fish they received with and without tags. Write to the Tag Lab, FRED Division, 3333 Glacier Highway, P.O. Box 3-2000, Juneau, AK 99802-2000 (907-465-3483) for a computer printout of all the reported "tagged" fish from that buyer. This will show the migration of the entire pedigree of each fish. Optional: Develop a data base—where are all the pinks going? Coho? Make a prediction of how good a fishing season will be based on these facts. Find out information about fish prices and calculate how much a fisherman can make by catching given numbers of fish. Discuss how markets affect fish prices.

3. Students brainstorm potential products they could create and sell, concentrating on those using local materials. Narrow the list down to some real possibilities and research the potential markets for such products (library books on marketing are available, or contact Entrepreneurship, OAVE, Dept. of Education, P.O. Box F, Juneau, AK 99811. If such products are feasible try them out, or pass on your ideas!

4. Complete a market survey of your community or the families in your class. What kinds of soap do you use? What kinds of foods do you eat? What are your opinions about certain products? Compile your information into a computer data base. Make your survey complete and realistic, then make some predictions about your market from the data you have collected.